THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. CXI. No. 2465.] LONDON, AUGUST 9, 1910. [62ND YEAR. PRICE 6d.

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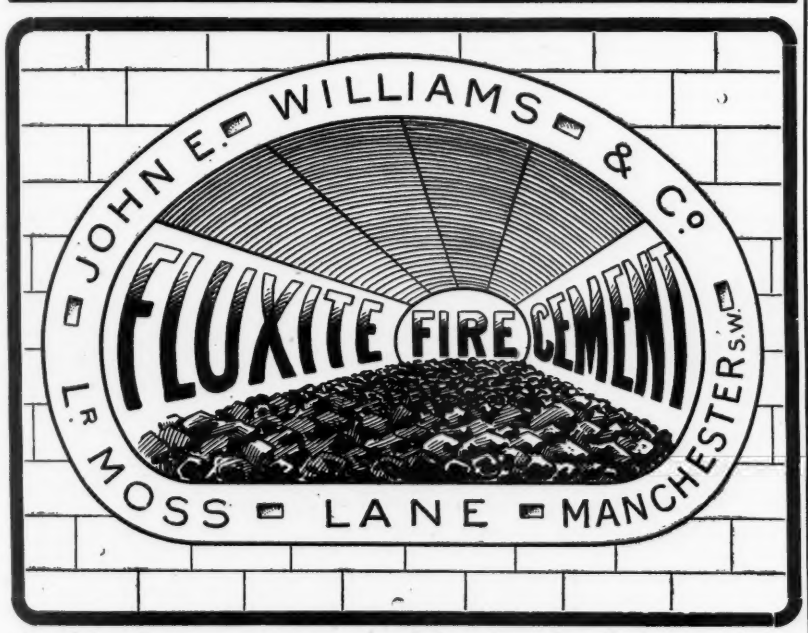

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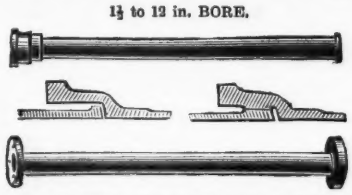

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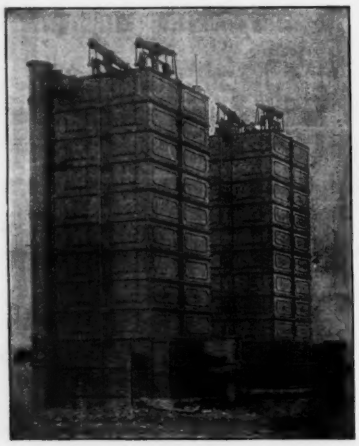

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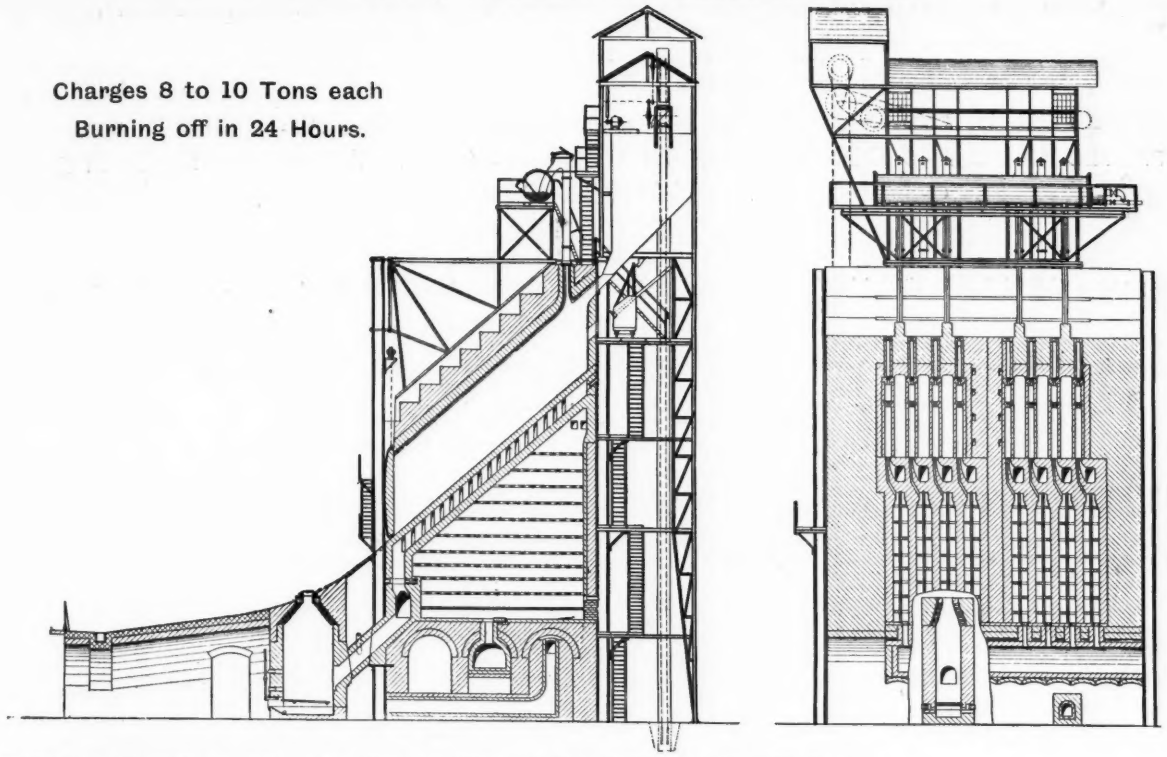

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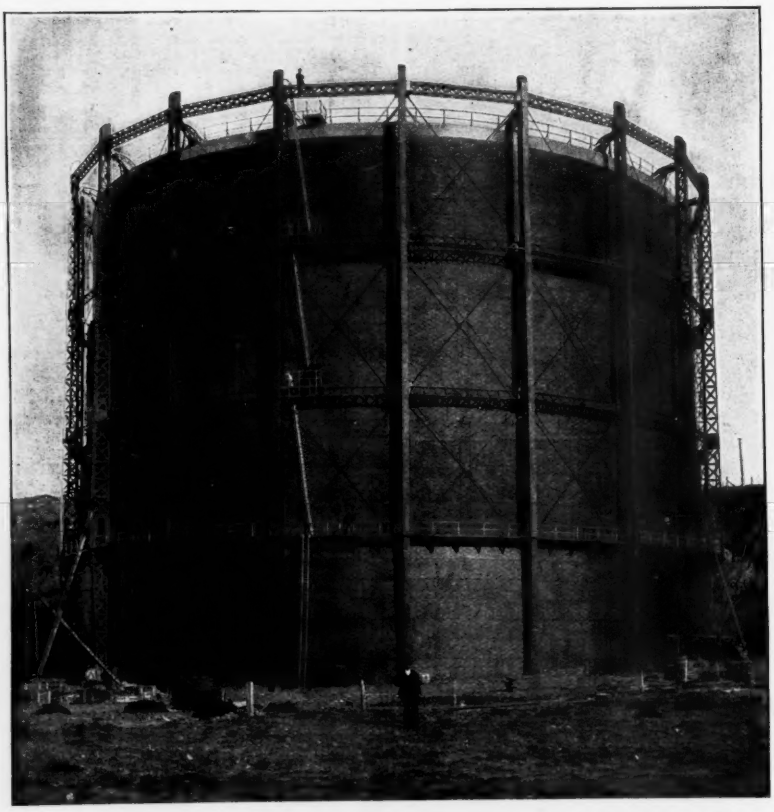

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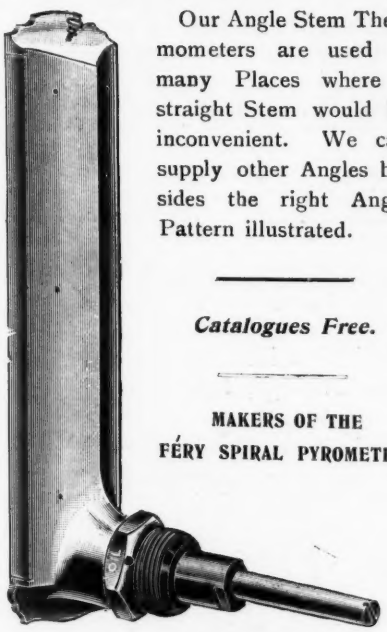

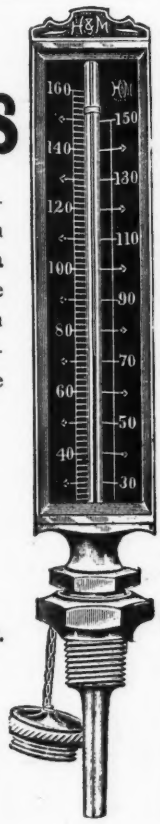

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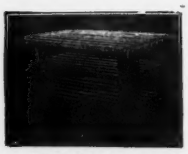

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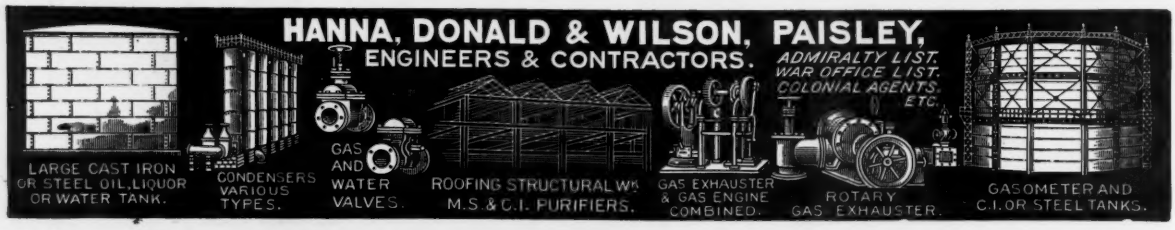
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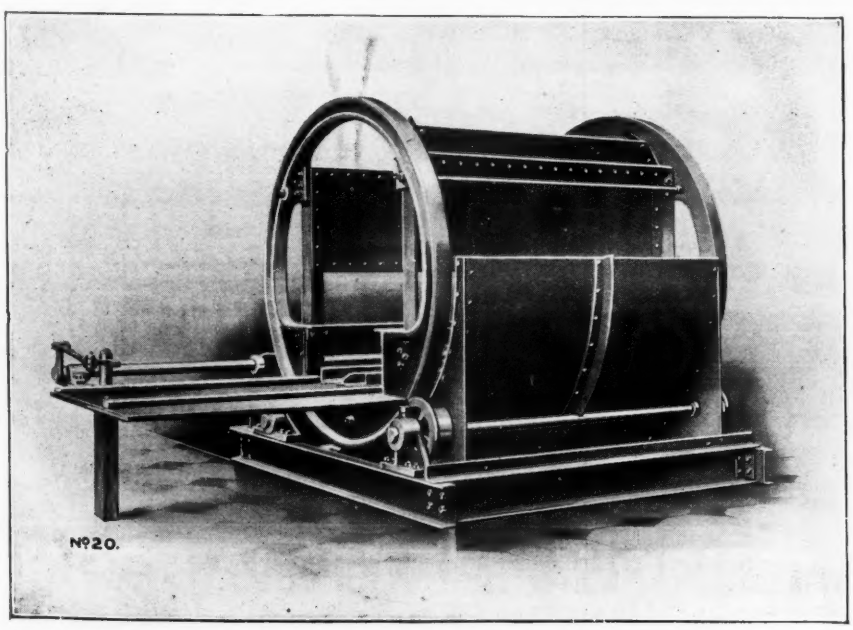

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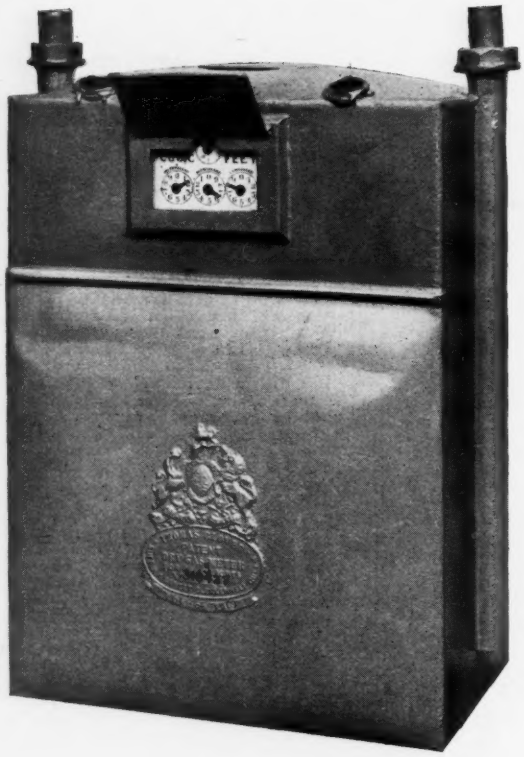

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VOL. CXI., No. 2465.—TUESDAY, AUGUST 9, 1910.

EDITORIAL NOTES—GAS, &c.

The Lines to Increased Stability.

PROGRESS such as the Gaslight and Coke Company have been making in their administrative, technical, and commercial departments, has been, and must continue to be, the result of an amount of hard work of which but a poor appreciation can be formed from the outside. Those who were well acquainted, though outside the Company, with the stereotyped conditions of a bygone time, can perhaps shape some sort of estimate of the hard work, though still an indifferent one. But all the vast labour, anxiety, and trouble are hidden from the gaze of the ordinary proprietors of the Company beneath the figured concentrations of the half-yearly accounts. To only those figures half year by half year, the major part of the proprietors look; and the latterly recurring feeling that "all's well," and that their interests are in safe hands, has had a sort of somnolent effect on them, and their contentment does not direct their feet to Horseferry Road. Friday's meeting was the first after the annexation of the West Ham Company; it marked the first complete year's working of the co-partnership scheme; and there were many interesting topics for consideration. Nevertheless, though the number of Gaslight proprietors has been supplemented by the West Ham proprietary and some 9010 worker co-partners, the attendance at the meeting was thinner than ever. The Gaslight and Coke Company is the premier undertaking of the gas industry, both in seniority and in size. It is one of the big recognized institutions of the industry; and we should like to see if something cannot be done to wake up a little more enthusiasm among the owners of the capital in the concern. We recognize fully that contentment has a deadening effect on shareholders; but are there any other reasons that keep them from these meetings? We suggest one. At Horseferry Road, there are all the conveniences for holding the meetings. Ample accommodation, immediate access to everything required, and it is suitable as a *rendezvous* for Directors and officers. But Horseferry Road is off the beaten track. It is away from the City; not central for railway termini other than Victoria Station; nor is it on the main routes of vehicular traffic. In a word, it is not sufficiently accessible; and there is a matter there for the administration to consider. A Company occupying such a position as the Gaslight and Coke ought, indeed, to have imposing offices in one of the most prominent positions in the Metropolitan area.

But to turn to the meeting on Friday. The address of the Governor (Mr. Corbet Woodall) was composed of many different matters, illustrating the numerous activities of the management and the ramifications of the business—technical and commercial; and, in the results, the care exercised in management and the zeal of the executive staffs and employees. It showed that the great aim of the work and policy of the administration is the progressive stability of the concern; and there can be no question as to the correctness of the lines that are being followed both within and outside the works to achieve the objects in view. At the head and front of the efforts to increase this stability, we would put the work that is being done among the staff and in the ranks of the employees. No big industrial concern does well that is ill-manned—that has employees indifferent to employers' interests, or employees whose intelligence is mediocre, and whose knowledge of their special branch of work has no sound substratum. At the end of a year's experience, the Governor is able (as we felt sure he would be) to attest to the mutual interest that has been fostered by co-partnership, and to the realization of the hopes of himself and colleagues—both Directors and officers. This result, springing from the application of co-partnership at, above all, the works of the Gaslight and Coke Company, should embolden those who were a time ago sceptical to acknowledge now that like effects could be realized anywhere by the same means. Then an effort of immense value in commercial relations and developments is the educational work that proceeds among the Company's large staff and employees in the distribution department. These men are the real links between Company and consumers, and between gas-utilization knowledge and ignorance; and their influence upon the business cannot be under-estimated. Their education incorporates not only principles and approved practices, but their ideas and knowledge of appliances are being constantly modernized. The work of the lady demonstrators, too, in the Company's area, cannot be too highly applauded.

Addition to stability is largely accomplished by serving in the best possible manner the interests of the consumers. The policy of the Board has included also an increased care in (as the Governor puts it) the "nursing" of capital. What has been the effect of this so far as the consumers are concerned? During the past five years, the price of gas in the Gaslight district, through the various economies in manufacture and otherwise, has gone down by pence (another 1d. is to come off next Christmas) per 1000 cubic feet, and the dividend has increased from £4 8s. to £4 13s. 4d. per cent. But through the "nursing" of the capital, the charge for dividend per 1000 cubic feet of gas sold is nearly 1d. less than at the beginning of the period named, which 1d. represents the handsome sum of about £100,000 a year. This is remarkable. There have been recent attempts, as part of the strategy of the opponents of the industry's progress, to traduce the character of gas companies by hinting at practices that bordered (to put it mildly) on dishonesty. The results of such administration as is presented not only by this, but by other gas companies, throw back the miserable slurring insinuations in the teeth of those who made them. And not only by the means already indicated—the new administrative policy, staff activity, the mutual interest engendered by co-partnership, knowledge disseminated by the special instruction of the workers, and dividend economies produced by the guarding of capital expenditure and a generous (but not too generous) attention to depreciation—but by extraordinary advances in manufacturing result has contribution been made to stability, and (as was shown last week in reviewing the Company's accounts) continues to be made. The laurels of the technical staff are many, and not less than those of the commercial staff, whose successes in the district have been great. It was the successes in public lighting competition that gave the Governor the material for the concluding part of his address. In short, whichever way one looks, it is seen that there is now in this huge concern a systematic pulling together from all quarters to bring about fresh accretions of stability, to the advantage of Company and consumers alike. In the work, the amalgamation of the West Ham concern and district has already, though the period of the alliance has been brief, proved its wisdom. From it, economies have already begun to issue; without detriment, but with advantage, to the service of the consumers. Much was said months ago from West Ham as to what would happen as the result of the amalgamation; but the fears are proving to have been nothing but the imaginings of a few political extremists.

The Half-Year's Working in South London.

ACCOUNTS such as those the Chairman of the South Metropolitan Gas Company (Mr. Charles Carpenter) will be presenting to the proprietors to-morrow require careful scrutiny, and not a mere glance, to avoid arriving at altogether fallacious conclusions. During the half year, the Company have added considerably to the strength of their position; and this is not ascertained by reference alone to the balance carried to net revenue account (£219,884), which is £42,606 less than in the corresponding period of 1909. It has to be remembered the price of gas was 1d. per 1000 cubic feet lower during the past half year than in the corresponding period; and taking the six months as a whole, the private consumption was only marking time. Influences affecting

consumption—most probably climatic—came into play in the first three months of the half year which caused the sale of gas then to recede. But in the midsummer quarter, we have this fact, that the receipts for gas—despite the price being 2s. 2d., compared with 2s. 3d. in the corresponding period of last year—were only £101 less, which suggests that the day consumption in those three months made an excellent move forward. As a matter of fact, the whole of the decrease in the private gas-rental (£27,601), save the £101, occurred in the first quarter of the year; the second quarter recouping itself in the striking manner mentioned. Taking the half year through, the sales of gas, 6,290,732,000 cubic feet, displayed an increase of 3,996,000 cubic feet, which is small, but is better than nothing. To the second quarter, however, must be given the credit for bringing about a result that could not have been hoped for if the experiences of the first quarter had prevailed. The factors that come into play now in creating rises and falls in consumption are greater in number, and more powerful in effect, than was the case in the olden days before such a diversity of uses sprung up to aid the industry's expansion. But the decline in gas receipts, which is about equal to the sum of the penny reduction, is only one item to set against the reduction of the transferable balance. If we look on the other side of the account, we can total up £55,038 more outlay on repairs and maintenance of works and mains and service-pipes and repairing and renewing meters, stoves, and fittings, which extra expenditure on the Company's property is £12,432 in excess of the reduction in the balance on revenue account. But the profit is sufficient to pay the statutory dividend at the rate of £5 9s. 4d. (2s. 8d. higher) per cent., increase the amount paid to workmen co-partners, and leave a surplus of £12,932 to add to the undivided balance.

From these few considerations alone, it is seen that there is abundant reason for the submission with which this article opened—that these accounts will not brook a mere glance upon which to form judgment as to what the half year has done for the Company. But with increased politic expenditure and the sales of gas not recouping the reduction in the price of gas, and yet the balance to net revenue merely affected to the extent already indicated, it is patent that, at least in one direction, the operations must have resulted in material economies for the concern. That direction is the carbonizing department, which has again, continuing recent history, served the Company and the consumers well. The expenditure on coal, £321,959, was £46,736 less than in the corresponding half of 1909; and this reduction of cost was partly accounted for by the fact that the quantity of coal carbonized (544,962 tons) was 25,113 tons less than in the first half of the year 1909, though the quantity of gas made (6,441,516,000 cubic feet) was 34,734,000 cubic feet more—the quantity of gas paid for per ton of coal carbonized being 11,543 cubic feet. There is good working here; and going back but a few years, one looks on the then carbonizing results and on the present with somewhat curious feelings as to what might have been if recent happenings had only happened before. But while the carbonizing results will undoubtedly live up to the newly established records—perhaps will pass beyond them—in the immediate future somewhat heavier charges for coal have to be borne, due not to any great industrial boom, but to that big legislative mistake the Coal Mines (Eight Hours) Act, and, in addition, the Port of London dues, which are going to make some addition to coal costs.

Running over certain of the other items of expenditure on manufacture, purification increased by £4041, but carbonization wages decreased by the substantial amount of £6629; while repairs and maintenance of works went up by £27,086, due mainly to the coal-handling plant renewals. The total outlay on manufacture (£518,488) was £20,609 less. Distribution charges (£161,356) were £28,716 more; but this increase is exceeded by additional amounts (in all £29,685) spent on repairs, maintenance, and renewals of mains and service pipes, stoves, and fittings. The additional sum expended on the public lamps suggests that the Company are continuing to prosecute their scheme of converting them to inverted burners. Among other items are noticed indications of an improvement in the general moral character in the Company's district—the bad debts being some £400 less than in the corresponding half of last year, and the number of slot meters broken open (4435) being nearly 1000 less, and the amount of money abstracted (£369), about £200 less. The total expenditure was £805,434, or an increase of £13,967.

The chief point of interest on the income side has been dealt with when referring to the gas sales. But the total income from gas (including public lighting) was £669,197, or less by £28,348—due, as explained, to the reduction of price. The meter and stove rental (£69,395) advanced by £1396. The number of meters in use (349,970) is greater by 8611; that of ordinary stoves (78,515) is higher by 737; that of slot-meter consumers' stoves (199,329) is more by 7779; and that of gas-fires (25,950) is greater by 2368. Concerning residuals, the receipts from tar and breeze remain the same; those from coke are rather lower; but there is a distinct improvement in sulphate of ammonia. But the final result, £244,814, is not so good by £4596. The receipts for fittings amounted to £40,387, which is better by some £3000. Finally, then, the total income is £1,025,319, or less by £28,639. This decrease added to the increase of £13,967 in the disbursements, makes the difference of £42,606 shown by the balance (£219,884) transferred to the net revenue account. Nevertheless, it is clearly seen that this ultimate figure does not in any way reflect the excellencies of the half-year's operations.

To Create New Demands for Sulphate of Ammonia.

A LARGE amount of specially interesting information is published this week in our news columns concerning the work of the Sulphate of Ammonia Committee; and we would particularly ask the consideration of all readers (among whom there is not one who is not directly or indirectly concerned) to the facts disclosed by it. The facts point as incisively as anything can possibly do to the necessity, in the interests of the future of the sulphate of ammonia market, of no half-hearted measures in propaganda work, and of complete adhesion of all, and not part only of the, producers in the United Kingdom. Pondering over these facts, one is struck, and that forcibly, by the plainness of their indications. It is not a common occurrence in the produce markets that one has the directive signs regarding the future set forth in such strong relief; and sulphate of ammonia producers at home, speaking collectively, will only have themselves to blame if they do not give proper weight and signification to the indications, and, by cohesion and material contribution throughout the United Kingdom, accord their support to the systematic work that is being done to create expansion of demand equal to the annually progressive output of the commodity. The Executive of the Sulphate of Ammonia Committee have given to the acutely defined signs their due importance, and are moving accordingly in several ways. They will, however, be impotent as an agency for lasting good unless they are loyally and strongly supported in keeping at work the increased machinery that is necessary, under present and prospective changing conditions in the sulphate of ammonia market, to create new demand, not only at home but abroad—but more especially at home—that shall have correspondence with the largely expanding supply, the potentiality of which in the matter of reducing market prices in future, if there is no creation of any fresh demand, is great. We do not wish to pose as alarmists; that is far from our thoughts. But we do desire to impress, and that seriously, the importance of a proper appreciation of the signs of coming events in the matter of supply, and of the economic truth that an article cannot maintain its price if the demand falls, to any extent, to the rear of production.

Looking ahead, the Executive of the Sulphate of Ammonia Committee have come to the conclusion that a more extended propaganda scheme designed for creating fresh demand is essential; and they have already set to work to give effect to their determination. Now on what grounds have they so decided? The grounds are well defined. Ten years ago, the world's estimated production of sulphate of ammonia was 495,000 tons; while now it is computed to be not short of 961,000 tons. This means that the supply has practically doubled in a decade. That is rapid progress. Year by year there is an increase in output on an enlarged scale in this country—chiefly now from coke-ovens, shale-works, and iron-works. Something like 24,000 tons represented in 1909 the development upon the preceding year in production in this country from sources other than gas-works; and no one can say when this is going to end, as all coke-oven owners who can do so will, as opportunity offers, convert their systems to the recovery form. Then, again, the abstraction of nitrogen from the air is an accomplished fact. Though too, this country has now friendly inter-relations

with other countries in the matter of propaganda work, it must not be forgotten that those countries have had the advantage of being before us in more generous schemes of propaganda. Then, furthermore, there is the competition of other nitrogenous fertilizers. The effect of the increased output of sulphate of ammonia must be, if there is not complete absorption in future, and so maintenance of market values, to bring down the prices of the competitors, as has already happened in the case of nitrate of soda. And of this we may be sure, that the competitors are well informed of, and are fully alive to, all that is being done to create new demand in connection with sulphate of ammonia; and their knowledge will have a contrary effect to that of discouraging their endeavours to sustain favour. The nitrate of soda people have the advantage that they can reduce output according to the dictates of demand; while sulphate of ammonia is a secondary product of processes that must go on. The production cannot be stopped; but we do not want an excess of supply over demand. That is the situation, immediate and prospective; and the known factors composing it are sufficient to urge the prudence of "taking Time by "the forelock," and vigorously prosecuting work in order that the demand shall be on a progressive scale in parallel with the supply.

The overthrow of custom, the setting up of new beliefs among agriculturists, and the consequent opening up of new outlets, do not by any means form light work. Special study, and unremitting effort in giving light and leading, are needed. The proof of the truth as to the superiority of sulphate of ammonia has to be forced upon users of fertilizers. In this matter, there has been something to learn from the comprehensiveness of the propaganda work of other countries; and the new manager and lecturer to the Committee (Mr. W. Popplewell Bloxam, B.Sc., F.C.S., F.I.C.) has been gathering from the Continent information of considerable value as a guide and, we hope, as an incentive. Reading the condensed report published elsewhere of a special conference of sulphate of ammonia makers, one feels almost ashamed of the rearward position held in this country in comparison with America, Germany, France, and Belguim in regard to propaganda enterprise. Representatives of three of these countries sketched at the meeting what has been, and is being, done in them in this regard. Figures show the effect. Their words and information should inspire to greater things here. One feels altogether abashed to see how proportionately badly off we are in contribution to propaganda work in comparison with those other countries. Only 60 per cent. of the total production of sulphate of ammonia in this country contributes to the propaganda work, as against 90 per cent. in Germany, France, and Belguim, and nearly 100 per cent. in the United States; and though our percentage of production contribution is so low, the amount subscribed per ton stands at the bottom of the list—severely poor and insignificant in contrast with the robust figures of our Continental neighbours. On propaganda work, Germany spends 2s. per ton; Belgium, 1s. 8d.; France, 1s. 7d.; America, 10d.; and Great Britain —— 7d.! It is not the fault of the Sulphate of Ammonia Committee that the propaganda work has not been on a scale commensurate with (say) that of Germany or America. The fault lies at the doors of the producers of 40 per cent. of the sulphate of ammonia output in the United Kingdom, and of the less generous contribution per ton. This we hope is going to be altered now. The Committee have taken powers (but only 7d. will be asked for this year) to levy a subscription of 8d. per ton, which will then be 2d. less than America, and 1s. 4d. less than Germany, with respectively 100 and 90 per cent. production contribution; and they earnestly invite the outstanding producers to come in and assist in the work—work creative of demand and protective of interests—on the enlarged scale, as indicated in the Committee's report published elsewhere in to-day's issue. From the at present non-contributing percentage, they hope to get the financial succour, with the extra 1d. per ton, to enable them to persevere with the enterprising endeavour to keep demand, at any rate, *pari passu* with supply.

The non-contributors are asked to look at the question seriously, and to take a perspective view of possibilities. Then to interrogate themselves as to whether they are now acting fairly or wisely in taking a listless attitude or determinately keeping aloof from this co-operative effort. In some quarters—among certain dealers—there is a little misconception as to the real objects of the Committee. Their labours are not directed to the regulation of market prices in any way, other than the regulation that all producers must desire, and that is the maintenance of prices, as opposed to the depression that must result from inactivity. The work of the Committee is purely intermediary as between sulphate of ammonia makers and those who can profitably make use of nitrogenous fertilizers. The work is intended to be (as it has been within the limits of activity) creative of new demand, through educational means—lectures, literature, exhibitions, competitions, and large-scale growing demonstrations—and through co-operation with kindred Continental bodies. Their efforts are those of pioneers and removers of obstructions due to incomplete knowledge. Let this be carefully weighed: Without new demand, the freely presented indications assure us, the market value of sulphate of ammonia must in the near future recede. How better than by the plans of the Committtee is fresh demand to be created?

Another Electrical Fallacy Exposed.

Some few weeks ago the "Elektrotechnischen Zeitschrift," in the course of comments on the decision of the City Council of Westminster to displace electric arc lamps by high-pressure gas-lights for street lighting, asserted (as some of our London electrical contemporaries have done) that a 3000-candle power high-pressure gas-lamp had not so far been achieved for practical use. A lamp of this nominal candle power in London was stated to have shown no more than 2500 Hefners—or, say, 2250 candles—on repeated measurements (*ante*, p. 188). The falsity of this general statement has already been effectively demonstrated by German testings of high-pressure gas-lamps; and we now have in a letter from Mr. J. F. Simmance (which is published in our "Correspondence" columns to-day) a clinching refutation of the slur which the electrical press has endeavoured to cast upon the high-pressure gas-lamps in use in the streets of London. Measurements made on one of the lamps in Aldwych on Thursday last by Mr. Simmance showed that the mean candle power at angles which are of most moment is actually 4000 candles, or about 4450 Hefners. Thus, not only is the modern London high-pressure gas-lamp proved to have a candle-power nearly twice as high as the 2500 Hefners which the electricians have sought to ascribe to it, but the general statement that a 3000-candle power gas-lamp has not been practically achieved is shown to have been an impious fabrication by which it was hoped to bolster up the fast-fading claims of the electric arc lamp to the most powerful unit for public lighting. Facts are stubborn things; and we hope that, when the electricians believe they have achieved an arc lamp of as high candle-power as the Aldwych gas-lamp, they will invite Mr. Simmance to confirm their belief by tests with his street photometer. When equality of candle-power has been attained, we may inquire of the electricians the cost for the arc lamp in respect of current consumption and maintenance charges. Their first efforts, however, must be directed towards establishing a mean illuminating power of 4000 candles, or 4450 Hefners, for any arc lamp.

Mr. Simmance calls attention to a point in connection with the testing of the illuminating power of street lamps which becomes of considerable importance when a minimum candle-power has been stipulated for. This is the effect of variations in the pressure and humidity of the atmosphere on the pentane or other flame standard of light, and on the light afforded by a street lamp. When the latter is of the high-pressure gas type, the relative effect of atmospheric changes must undoubtedly be less than with a gas-flame supplied at ordinary pressure. But we are scarcely in a position to deny that the light afforded by high-pressure gas-lamps is not slightly affected by fluctuations in the pressure and humidity of the atmosphere; and undertakers of street lighting under a guarantee of candle-power must allow sufficient margin to ensure the stipulated candle-power being afforded in the worst atmospheric conditions. We are, of course, speaking of the case in which an absolute candle-power is guaranteed, irrespective of the rate of consumption of the gas in the lamp. The pentane or other flame standard is known, however, to vary with changes in atmospheric pressure and humidity; and it is but right that the effect of these variations should be eliminated in determinations of the light afforded by high-power lamps. For instance, on a frosty day with a high barometer, the pentane standard may actually be affording a light of (say) $10\frac{1}{4}$ candles instead of 10 candles; and if the candle-power of the high-pressure lamp

under comparison with it were reckoned on the assumption that the standard was actually of its nominal value, the light of the gas-lamp would be returned as of about 3900, instead of 4000 candles. It is necessary that, where an absolute candle-power is guaranteed for gas-lamps in competition with electric arc lighting, the standard of light to be employed in the tests either should be unaffected by variations in the atmospheric conditions, or its value should be corrected so as to eliminate the effect of the latter.

Illegal Overdrafts, and Borrowings without Sanction.

THE hands of the Local Government Board have been considerably strengthened by the decision that has been given by Mr. Justice Neville in the action by the Attorney-General, at the relation of certain ratepayers of West Ham, against the Corporation and Mr. Patterson, the Borough Treasurer. The action had reference principally to overdrafts for general purposes and to borrowings on account of the electricity undertaking anticipatory and in excess of the sanctions of the Local Government Board. This sort of thing has been peculiarly prevalent since the large inroads by municipal bodies into electricity adventure; and while the Local Government Board admonished, they seemed entirely void of power to stop any such procedure. Only the other day, the Chairman of Section A of the Local Legislation Committee of the House of Commons (Sir F. Layland-Barratt) severely criticized the Warrington Corporation, in connection with their Omnibus Bill, for entering into large expenditure without properly providing loans to meet it, and for coming before the Committee with the request that they should whitewash them for what they had done. The only "safeguard" ratepayers have against indiscreet and illegal borrowings is the Local Government Board. But many municipalities—the West Ham Corporation is one of several instances, but a bad one—have deliberately over-ridden the Board in most contemptuous fashion. The Board cannot be held altogether blameless—speaking generally, not particularly of West Ham. There are occasions when their assents or refusals have been deferred a tantalizing and unreasonable length of time. But this is not the common occurrence. The common occurrence has been the other way about—overdrafts and expenditure and borrowings in excess of sanctions long before the Board have even been approached. The Board, in fact, have had their authority and their control in relation to local finance disregarded with supreme indifference; and their warnings have often been the object of ridicule.

The West Ham Corporation, as already said, have been especially bad sinners, both in respect of general and electrical purposes, in this matter of overdrafts and excess borrowings. We need not, in view of the reference in our "Legal Intelligence," particularize here the extent of their financial misdemeanours. It is the principle of the whole thing, rather than the degree in any single instance, that concerns us. This is a form of transgression that has grown and spread among municipal bodies; and the sooner an effective stop is put to it, the better. Mr. Justice Neville's judgment will have a salutary effect to this end. The Council had obtained an overdraft from the bank for general purposes in respect of borrowing powers granted for specific objects. This his Lordship declared *ultra vires* and illegal. The Corporation had applied money due to the consolidated loans fund towards the repayment of the overdraft. This his Lordship also declared *ultra vires* and illegal. The Corporation had borrowed money from the bank for the purpose of the electricity accounts; and the doing of this, otherwise than in the exercise of borrowing powers with the sanction of the Local Government Board, his Lordship likewise declared *ultra vires* and illegal. These declarations have no doubt come as a shock to many municipal authorities; but they will hereafter find them very useful in view of the fact that they, in a sense, define what they may not do in these particular matters. They go further than this, and afford additional protection, inasmuch as banks will be very chary henceforth in accommodating municipal authorities financially in any way that might infringe the declarations of Mr. Justice Neville in the West Ham case. Concerning the liability incurred by the London and County Bank in this instance, his Lordship was relieved from expressing his opinion in respect of this aspect of the case by an arrangement by which the bank refunded several thousands of pounds interest received by them on the balances of overdrafts. The event showed their wisdom in coming to this arrangement; for, as the whole of the transactions were *ultra vires* and illegal, their position might have been worse in the end than under the timely compromise that was effected. For municipal bodies and banks on the one hand, and ratepayers on the other, the decision is of exceeding great value, and will do much towards disciplining the financial acts of the first-named and settling their financial affairs on a sounder basis. There is a growing feeling in Parliament and among ratepayers that local finances require more rigid regulation than they have hitherto received.

Standard Burner Bills—An Appeal to the Public.

There is one thing for which credit can be given to the opponents of the Standard Burner Bills; that is consistency—consistency in their tenacity to a lost cause, their refusal to see the rational side of the question, and their persistency in misrepresentation. An article in a provincial paper suggests that they are now appealing from the House of Lords and the House of Commons to the people; and what they want the people to do is to stir up their representatives in Parliament to see that, before the Bills are finally passed and receive the Royal Assent, clauses are inserted providing for that *quid pro quo* about which so much has been heard (and which the House of Commons Committee have properly said is so amply provided for in existing legislation), in the shape of a reduction in the price of gas, or, alternatively, provision for "maximum and minimum calorific power tests for the quality of the gas supplied." If the two Committees of Parliament who gave such careful and patient attention to all that was laid before them could not understand the questions at issue, certain it is that the public will not understand it from the one-sided and extravagant submissions in the article before us. For that poor, misguided, and heedless user of flat-flame burners, pity is asked; and the terrible injustice to him is laid bare, instead of the advice being tendered to give up his foolish practice, and not adopt the "Metropolitan" No. 2 burner or any other argand whether dear or cheap, but bring to his service the low-priced incandescent burner, and get the fulness of the capacity of the gas for rendering illuminating power by the incandescing of a mantle. These Standard Burner Bills have disclosed what a wonderfully lavish amount of sympathy can be expended on the undeserving.

Carbonization Results.

One of the most interesting features of the report of the Directors of the South Suburban Gas Company to which the Chairman (Mr. Charles Hunt) had to direct attention last Friday was this statement: "A further improvement in carbonizing results forms a gratifying feature of the half-year's working. The average production of gas per ton of coal carbonized exceeds all previous records of the Company; and the cost of carbonizing labour now ranks among the lowest in the Kingdom." It is not observed that Mr. Hunt stated what these carbonizing costs were per 1000 cubic feet of gas sold. Perhaps his modesty, and that of Mr. S. Y. Shoubridge (the Engineer), would not allow him to. It is seen from the accounts that the quantity of gas sold in the half year was 696,654,000 cubic feet, and carbonizing wages amounted to £3656 11s. 10d. Dividing the latter figure by the former, we calculate that the cost of carbonizing wages per 1000 cubic feet sold was slightly under 0·8d. The statement in the report is justified. The production of gas per ton of coal in the half year averaged 11,700 cubic feet, or 370 cubic feet per ton more than in the corresponding period of last year—representing a saving of 1939 tons of coal. There are some engineers who are sceptical as to any large advantage accruing from such increased makes, lower carbonizing wages, and lessened quantities of coal carbonized. They point to increased fuel accounts, and higher charges for repairs and maintenance; and to the fact that, with a smaller quantity of coal carbonized, there is a reduced quantity of coke, tar, &c., for sale. We are among those who do not think that any general harm will accrue to the industry by the volume of supply of secondary product being reduced relative to the sales of gas. The markets, taken as a whole, will stand a real withdrawal of part of the supply. And a complete answer to those who doubt the advantages of realizing a higher gas production per ton of coal may be found in the improved financial accounts of all companies who are workimg under the modern conditions.

Capital and Dividend Charges.

The importance of giving careful consideration to capital expenditure and depreciation cannot be too urgently impressed on all gas company administrators by their technical officers. The effects of prudence in this matter are remarkable, and beneficial alike to consumers and undertakings. Twice during the past week Mr. Corbet Woodall has, in speeches at meetings of gas proprietors, given striking illustration of this. At the meeting of the Gaslight and Coke Company, he pointed out that, by prudent attention to capital expenditure and depreciation, the charge for dividend in five years had descended by nearly 1d. per 1000 cubic feet, which represented to the gas consumers the handsome sum of about £100,000 a year. Notwithstanding this decreased claim for dividend per 1000 cubic feet (the price of gas has receded by 3d. or 4d. per 1000 cubic feet), the dividend per cent. of capital employed has gone up from £4 8s. to £4 13s. 4d. We remember, about five years ago, hearing Mr. Woodall privately bemoaning the price charged for gas by the Gaslight and Coke Company, and the lowness of the return to the proprietors. Time has brought changes. Again, speaking at the Tottenham and Edmonton Gas Company's meeting on Saturday, he pointed out that the capital ten years ago was equal to £526 per million cubic feet of gas sold; and the charge for interest and dividend was 8·75d. Now the same items are respectively £431 and 6·2d. Thus the charge for interest and dividend is 2·55d. less per 1000 cubic feet than it was ten years ago. In this case, too, the price of gas has dropped considerably; and the dividend has gone up in a manner that has caused the proprietors who owned stock ten years ago, and have kept it, to rejoice. In the case of both Companies, a further 1d. reduction in the price of gas is promised next Christmas. These are conditions over which the Chief Engineers of the Companies (respectively Mr. T. Goulden and Mr. A. E. Broadberry) and their colleagues may be most heartily congratulated in company with their Chairman and the Directors.

Personal.

Mr. JARDINE, of the gas-works staff at Dumfries, has been appointed, out of a large number of applicants, Manager of the Dalbeattie Gas-Works, in room of Mr. W. Spowart, resigned.

At their quarterly meeting last week, the Belfast Borough Council passed a resolution adopting the part of the proceedings of the Council in Committee on the 14th ult. (*ante*, p. 178) relating to the appointment of a Gas Engineer and Manager. This confirms the selection of Mr. JAMES D. SMITH, of Stirling, to the position, at a commencing salary of £800 per annum, with house and gas.

In the "JOURNAL" for the 28th of June, it was announced that Mr. H. KING HILLER had relinquished the position of Engineer-in-Chief of the Shanghai Gas Company, Limited, with the view of returning to England and commencing consulting practice in London. Before leaving Shanghai, he paid a professional visit to Manilla, in the Philippine Islands, on behalf of a Syndicate who are about to construct gas-works in the city. We are pleased to learn that he reached England safely last Friday.

It will be seen, from the notice of the proceedings at the recent annual meeting of the Sulphate of Ammonia Committee, which appears elsewhere, that Mr. W. G. BLAGDEN, who was identified with the formation of the Committee some fourteen years ago, and was Chairman continuously during the whole period of its existence, has found it imperative to relinquish the position; and his resignation has been accepted with the utmost reluctance and regret. Mr. MILNE, of the Gaslight and Coke Company, who was for some years Deputy-Chairman of the Committee, has been unanimously elected Mr. Blagden's successor.

Presentation to Mr. Bernard F. Browne.—We learn from the "Review of the River Plate" that Mr. Bernard F. Browne, the Manager and Chief Engineer of the Primitiva Gas and Electric Light Company, was made the recipient on the 3rd ult. of a gold medal by the works employees, and of an album by the other employees. Mr. Browne joined the Company about eight years ago as Engineer at the Retiro works, and on the retirement of Mr. G. W. Anderson in 1906 he became General Manager and Engineer, which post he held until the amalgamation of the three Companies. During his connection with the Company he brought the service up to a very high standard of efficiency. He was held in the highest estimation by his Directors and all the members of his staff; and during his residence in Buenos Ayres he made numerous friends, who regret that it is not probable that he will return. It was mentioned in the "JOURNAL" for the 7th of June that he would shortly be leaving Buenos Ayres for England; and he started on the 4th ult., accompanied by his sister. He is a son of Mr. A. F. Browne, of Vauxhall.

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 416.)

THE Stock Exchange had a dull time last week, and five days were quite enough of that. Business was on a reduced scale and devoid of any remarkable interest; the most noticeable feature perhaps being the obstinate weakness of Consols. After having closed well the previous Friday, markets, upon re-opening on Tuesday, were disposed to be rather cheerful. But once again foreign influences came in and spoilt the position. American advices were flattening, and Continental selling was resumed. Government issues were weaker; and Consols receded ⅛. Rails were nervous about labour troubles, and lower prices were the rule pretty well all round. On Wednesday, there was some recovery, though dearer money knocked Consols down another ⅛, and business grew a little more active. Rails were calmer and stronger; Americans looked up a bit, though rather jumpy; and Foreign were firm. The activity died down on Thursday; and the hardening of money lowered gilt-edged securities. Rails were a tug-of-war between good dividends on the one hand and strike fears on the other. The Foreign Market was steady. Friday's business was quiet; and the general tendency was to droop for lack of support. Most markets were dullish, though some of the speculative lines were in favour. Saturday was another dull day. Consols were ⅛ lower, and prices in general were for the most part down. In the Money Market, the supply was abundant to meet all the demands for loans. Discount rates hardened in face of a large issue of Treasury Bills. Business in the Gas Market was on a holiday scale; but prices did not suffer from that, and the general tendency was very good. In Gaslight and Coke issues, the ordinary was quiet and strong, though one bargain was marked specially at 106¼. All the other transactions ranged from 106½ to 107—a rise of ½. In the secured issues, the maximum realized 89½, and the debenture from 80¼ to 80⅜. Not much was done in South Metropolitan; but transactions were between 122¼ and 123—a rise of 1. The debenture changed hands at 80 and 80½. In Commercials, there was no business marked. Among the Suburban and Provincial group, Alliance and Dublin was done at 81 free (a fall of 1), Brentford old at 255, British at 44¼, and Brighton ordinary at 154 and 155. In the Continental companies, Imperial was quiet and firm at from 179½ to 181, Union realized 91 (a rise of 1), ditto preference 135½, and European fully-paid 23¾ and 23½—a fall of ½. Among the undertakings of the remoter world, Bombay changed hands at 6¼, Primitiva at from 7 1/16 to 7⅜, ditto preference at from 5⅛ to 5⅜ (a fall ⅛), and ditto debenture at 97⅞ and 98.

ELECTRICITY SUPPLY MEMORANDA.

Wires and Fires: Another Terrible Story—Plunder—Lamp Patent Wars and Rumours of Wars—Degenerate Finance at Bristol—Faversham's White Elephant.

SINGULAR, indeed, is it that so many people are callously heedless of warnings. After the terrible life-destroying and property-consuming fire at Clapham last Christmas time, it might have been expected that every similar establishment would have taken all possible steps in the endeavour to have assured the place against a similar catastrophe. But though the Clapham warning was so recent, though at the time the terrible story ran through the country and caused universal sympathy, we have almost like circumstances repeated at Accrington, with a roll of five lives (all comparatively young women) lost and a considerable destruction of property. And the origin? The means by which the so-called "safest" illuminant is so largely provided in similar establishments. Throughout the country, this fresh story from Accrington has been published; and coming on the top of the Clapham "holocaust," the Electricity Publicity Committee will have something to do to blot from the minds of people that the outstanding cause—the origin—of the fire was due to the fusing of an electric wire. It was on the Saturday night preceding the Bank Holiday. The big drapery establishment of Messrs. Williams, Limited, was thronged; when a flexible wire in one of the shop windows fused, and though the manager of the department seized the wire and endeavoured to smother the flaming insulation, the inflammable goods in the neighbourhood were already well alight, and the devastating work had begun. Flexibles and lamps appear to have been used indiscriminately in this window for the purpose of giving effect. There was a small outbreak only a few weeks previously in the same premises, and some towels then caught fire—through the fusing of a wire. The wiring, it was declared at the inquest, was put in by a competent electrical engineer; and had frequently had attention since. The evidence as to the origin does not leave any doubt; and Mr. Harold Gray, the Electrical Engineer to the Accrington Corporation, does not question the fusing of a wire being the cause, because at the inquest he commented on the dangerous practice of putting flexibles and lamps in proximity to inflammable materials. But our electrical contemporaries as usual try to veneer the real thing with "ifs" and such expressions as "it is alleged." One electrical paper seems to have missed the fire altogether. Regarding the loss of life, it is thought by some that the lives might have been saved if there had been greater presence of mind at the beginning of the

fire, and had the fire brigade arrangements been more perfect. Those are matters about which we cannot say anything. But the evidence is conclusive as to the rapidity of the spread of the conflagration; and one realizes the excitement that must exist at such a time. Turning from Accrington to Herne Bay, when the new pavilion of the pier was crowded with people, just before nine o'clock on Thursday evening, the fusing of an electric wire caused a fire that fortunately was soon subdued, and without producing much damage. But the volumes of smoke that rolled in at the entrance occasioned considerable alarm, and those on the spot—not the occupants of the editorial chairs of our electrical contemporaries in the neighbourhood of Fleet Street—state that a stampede was only narrowly averted by the coolness of the conductor and members of the band. The origin of the recent fire at the Kelvin Hotel at Belfast has not been so definitely established as the foregoing instances; but in one quarter at least, the origin was attributed to the electric wiring.

Those administrators of municipal gas undertakings who are being compelled by Parliament to discontinue, or are being restricted in, the practice of taking profits from the concerns in aid of the rates, which concerns have never themselves asked aid of the rates, or those authorities who are prudently placing themselves under restraint in the matter, will be enabled to bear the curtailment of liberty with greater fortitude and equanimity by the knowledge that, in the electrical industry, there is a distinct movement in favour of keeping the profits made by a municipal concern for the benefit of its patrons, and therefore of the undertaking itself. Electrical managements are crying out for adding to stability, and for placing their concerns in a better position for fighting the competitor, by the sane utilization of surplus profits, instead of distributing them broadcast among the ratepayers. The question has lately been raised at Carlisle, Aston, and Dewsbury. The Local Government Board, following what has been done in the committee-rooms of Parliament, have been, at recent loan inquiries, scattering wise counsel in regard to the matter among local authorities—at Carlisle and Aston for example; and the sage advice of Mr. Hooper on the subject is causing no small amount of fluttering among those town councillors who stoop to the undignified proceeding of, as the Chancellor of the Exchequer would say, robbing gas and electricity hen roosts. Mr. Hooper is called blessed by electrical engineers when on this subject; but his equally sound views on the subject of public lighting brings on a head devoted to commonsense some terrible imprecations. But let that pass. We had from him, at Aston, the *reductio ad absurdum* in the matter of profit appropriation for the rates. He asked whether anyone could show him where the advantage came in of transferring to the reduction of the rates £1500 with one hand and borrowing £1500 with the other for an expenditure for services. In such a course, there is no advantage to the ratepayers, and no advantage to the undertaking. To borrow money with one hand at 3¾ per cent., and to pay it out as a bonus with the other, means that the ratepayers have to pay the 3¾ per cent. The argument is good in one way, if the ratepayers really pay the 3¾ per cent. But in well-conducted undertakings, the consumers pay the interest, and ought not to be called upon to pay more. All electrical concerns have not, however, been well conducted. Many have been carried on at prices for electricity that have not been equal to the weight of outgoings incurred in running the undertakings, and the ratepayers have had to supply the deficiency, which is unfair upon those who are not consumers. In our opinion, to the total of the deficits incurred by undertakings, and made good by the ratepayers, there ought to be a refunding to the latter from any future profits. Beyond this ratepayers are not entitled to, nor do they deserve, anything.

Though our electrical contemporaries are as silent as the grave over the matter this week, we are still hoping to be interested by them as to the success or otherwise of the prospectus of Metalite Limited. We are wondering whether the absence of information means a very sparse public application, and that the underwriters have received an extraordinarily high voltage shock. If so, then the promoters of the Company will long ere this have come to the conclusion that the public penetrated the character of the promoters' advertisements and prospectus, and were not prepared to accept as gospel all the statements that were made. Since the appearance of these advertisements and the prospectus, clouds have been crossing the metallic filament firmament; and they threaten some heavy legal storms. The General Electric Company have issued an "important notice to the public" regarding legal proceedings having been commenced, by the proprietors of the patents under which Osram lamps are manufactured, and against importers of tungsten filament lamps. But as the "Metalite" variety of lamp is a home production, it cannot be precisely said that the "important" announcement is directed to it. But it was significant that the Osram notice should have synchronized with the large advertisements of the Metalite Company. Then supplementing the Osram advertisement is one by the Thomson-Houston Company, in which they notify the public that no liability or risk of patent litigation is incurred by purchasing their lamps, as they hold a licence from the Osram Company. "Metalite" Limited have also had a look in with an advertisement equal in size to the Osram and Thomson-Houston ones combined, in which they claim "certain secret processes" and the protection of 27 patents and provisional patents in Great Britain and throughout the world. The "Electrical Review" has not been supporting the Metalite Company in their pretensions; and its criticism of the contents of the prospectus has had a strain of sarcasm all through. The remarkable dividend estimates are said by the Company to be based upon "results obtained by the vendor companies since the perfection of the patents and processes." The "Electrical Review," however, points out that "the British patents already granted date from 1907 (a patent *not* utilized in the British Metalite lamp) and Aug. 16, 1909. Of the patents applied for, six are dated May 3, 1910, and one June 1, 1910. What 'results' can possibly have been obtained from these?" However, we must confess to curiosity as to how the Company have monetarily fared in their appeal to the public, by plunging into extraordinary expense, fabrication regarding incandescent gas lighting, and bombast.

The Bristol Town Councillors do not seem to be able to arrive at any decided opinion as to the prospects of their electricity undertaking. Alderman Pearson, year by year, tries to make his sanguine temperament spread its influence throughout the Council Chamber; but it does not always work now. Councillors have seen the "profits" of the concern steadily dwindle year by year, till now they are a *minus* quantity; and they cannot for the life of them understand the wherefore, with increased numbers of units turned out and paid for—at a price. In 1905, a profit of £9844 was boasted. Since then the surplus has disappeared, and has receded into a shortage of the amount required to meet financial obligations—on this occasion to the extent of £2030, though it is only fair to say this is after putting £3109 to reserve to meet renewals. The councillors are told by Alderman Pearson that it is the metallic filament lamp that has done the mischief; but the surplus reflux began before the metallic filament lamps had foisted their ungainly shapes and glare upon the public eye. But these lamps have, of course, had a large economical effect. Every consumer who uses them makes himself a less profit-producing customer, and at the same time reduces the demand for the electric lighting station's best paying units. At the same time, new lighting consumers are not at Bristol coming on by leaps and bounds. Last year the undertaking only connected up 170 new consumers; and it must be remembered that the return on the capital expended per consumer in doing this is not so great as in the fat days of old. On the other hand, Alderman Pearson refers with eyes uplifted and heart full of gratitude to the fact that the power load has increased by 650-horse power. This is what the layman cannot understand. The power load increases the total output of units magnificently; but yet there is the fact of surpluses reduced until they have disappeared, and there have been new entries in the category of deficits. Better far, says the observer of local events, would it have been if the conditions of 1905 had been preserved. Instead, a large capital expenditure has been piled up for unprofitable business. With a wave of the hand, Alderman Pearson cries, "Look at the amount of capital that has been repaid," against which the hideous fact rises up that the financial results are not what they were five or six years ago before so much of the capital had been repaid. Facts are facts; and all Alderman Pearson's magniloquence will not disturb them from their rightful position among material things.

"Curses, not loud, but deep" there must surely be at Faversham over the continuation of the financial fiasco in connection with the electricity undertaking. When one looks into the accounts, one feels almost inclined to pity the compilers for the evidence that they contain of diligent scraping together of odds and ends of revenue (even to an instalment of a pupil's premium), and of the thinning down of the items of expenditure, to make a little better showing than before. Sympathy almost induces us to refrain from comment. But it is such undertakings as this, and the financial burden imposed upon the ratepayers, that stand as a protest against the gilded hollow advice that electrical experts were wont to give these ambitious and gullible local authorities in the days lang-syne, and still give when there is opportunity. It is our duty to call attention to them. Here is a little concern making losses year by year much larger than the total receipts from private consumers, and charging these losses upon the ratepayers, among the largest of whom is the Gas Company. Here is this electricity concern with an expended capital of £22,567 at March 31 last, and with £20,749 still owing. Yet the total sale of electricity to private customers brings in only £1015; and the ratepayers are charged a sum all but the equal of that by £300 for public lighting by electricity—making the total income from electricity £1727. The net revenue account shows a deficiency on the working, to be supplied by the rates, of £1276—making the total deficiency from the time of formation £6185—equal to more than one-fourth of the total capital expenditure. Is "scandalous" too strong a term to apply to this condition of things? We think not. Meanwhile the Gas Company flourish, despite the fact that they have been relieved of the larger part of the public lighting, to the disadvantage of the ratepayers, to serve the purposes of the needy but burdensome local electricity supply concern.

We learn from the Hon. Secretary (Mr. Octavius Thomas, of Pontypridd) that the Council of the Wales and Monmouthshire Institution of Gas Engineers and Managers intend arranging a series of classes in "Gas Supply" at Cardiff, Newport, Swansea, and Pontypridd during the coming winter.

Mr. Harold Porritt, J.P., Chairman of the St. Anne's-on-the-Sea Gas Company, died on the 31st ult., at the age of 55. He was principal of the firm of Messrs. Joseph Porritt and Sons, woollen manufacturers, of Helmshore, and second son of the late Mr. J. Porritt, one of the founders of St. Anne's.

THE PROFESSIONAL GAS EXAMINER.

It was reported in last week's "Journal" (p. 353), that the London County Council had adopted, without discussion, certain recommendations of the Public Control Committee in reference to the conditions of service of the gas examiners appointed by the Council. The recommendations and the report on which they were based were quoted in the "Journal" for the 26th ult. (p. 279); and as their adoption by the Council entails a radical change in the status of the gas examiners which may affect detrimentally the interests of the London Gas Companies and consumers, it is right that attention should be drawn to them.

The appointment of a gas examiner under the London Gas Acts is entrusted to the London County Council (as successor to the Metropolitan Board of Works) and, in regard to the City area only, to the Corporation of the City of London. The gas examiner so appointed is to be "a competent and impartial person"—a condition which applies also to gas examiners appointed throughout the Provinces under the Gas-Works Clauses Act, 1871. Hitherto the London County Council have appointed men whose obligations to the Council have been fulfilled when they have carried out the statutory testings for the day, and have made the reports thereon specified in the Acts. For the rest of the day, the examiners have been free to engage in other work; and since the Council have desired that a large proportion of the testings should be made after dusk, it is obvious they were thus able to secure the services of many men who devoted the greater part of the daytime to some other professional work. Attendance at the testing-place for about three hours each day sufficed for carrying out the necessary testings. For this work a remuneration of £135 (rising to £165) per annum has hitherto been paid; and for it the services of men principally engaged elsewhere as analysts, consulting chemists, lecturers, or demonstrators have commonly been obtained. The gas examinership has been only a subsidiary appointment held in such cases by energetic men of good professional standing as a means of filling profitably time which would not ordinarily be occupied by their general professional work. Obviously, the examiners obtained in this way have been men whose whole-time services could only have been secured for not less than treble the remuneration paid by the London County Council to them as gas examiners. Moreover, they have for the most part been men of much higher standing and repute than the Council could have otherwise secured, except at greatly enhanced remuneration. Consequently they have been generally accepted as competent in the sense in which that word is used in the London Gas Acts with reference to the person who may be appointed a Gas Examiner. This, coupled with the fact that their duties as gas examiners for the Council have constituted only a small part of their professional practice or work, has given them an independence of that body which has gone far towards ensuring the impartiality that the Acts likewise stipulate shall be an essential qualification of a gas examiner. On the whole, the arrangement has worked well; and despite attempts from time to time on the part of the Chemical Department of the London County Council to dictate to these "competent and impartial persons" how they should fulfil their duties, the Gas Companies and the consumers have seldom had serious reason to doubt that they were, and have remained, duly qualified in respect both of competence and impartiality.

Now the Council have decided to abolish, with all decent speed, this satisfactory system. They have arranged that the successors of the present gas examiners shall be officers whose whole services shall be devoted to the work of gas examination; that each of these officers shall have charge of two testing-places; that their salary shall be £200 (rising to £250) per annum; and that they shall be subject to the Council's usual conditions of service. The only reasons given in favour of the change are an estimated saving of about £300 a year, and that "a more efficient control over the work of gas testing would be secured by substituting for the part-time examiners, as they retire, a class of officers whose whole services would be devoted to this work." That is to say, for the sake of an estimated saving of £300 a year on an expenditure of over £3000 in respect only of the remuneration of the regular gas examiners, the Council intend to appoint men who for one-and-a-half times the remuneration will undertake twice as much work as the present gas examiners. Bearing in mind the fact that, as already explained, the present men have the most valuable hours of the day free for other work, and consequently are prepared to accept relatively low remuneration for their appointments as gas examiners under the Council, it will be obvious that the examiners appointed under the new scheme will be men whose professional services cannot command nearly such a high scale of remuneration as the services of the examiners now holding appointment. In other words, they will be immensely inferior in standing professionally; and the proof of ability and competence afforded by the market value of a man's services will, in their case, be far less satisfactory and well assured.

Much worse than this, however, will be their entire subservience to the Council, by which the latter will secure "more efficient control over the work of gas testing." If the gas examiner is competent, as the Acts require that he should be, he needs no control in the work of gas testing; nay, he should resent any attempt on the part of the Council to control his work as casting a slur on his ability and competence, and as constituting an unwarrantable interference with him in the performance of his duties. If he needs any control in the work of gas testing, there is *primâ facie* evidence that he is not competent, and is not therefore qualified to hold the appointment. The sacrifice of independence which is involved under the new system in the disability to engage in other work, and the fact that the gas examiner thereunder becomes wholly and solely a salaried officer of the Council, are the worst aspects of the change. It would be absurd to pretend, however, that gas examiners holding appointments in these terms are impartial persons in the sense in which this expression is used in the clauses of the London Gas Acts relating to their appointments; and consequently no report made by them will be susceptible of proof before the Chief Gas Examiner or a Magistrate. Thus the London County Council have stultified themselves by adopting the egregious recommendations of their Public Control Committee, and have only succeeded in warning the Gas Companies and the public at large of their aspirations to exercise *ex parte* more efficient control over work which the Legislature has expressly confided to "competent and impartial persons."

ASSOCIATION OF CONSULTING ENGINEERS.

Its Aims and Objects.

In view of the criticism which the proposal to form an Association of Consulting Engineers has met with, the Committee have issued a memorandum setting forth in detail its aims and objects; and they ask for publicity to be given to it.

The Committee point out that one of the principal objects of the Association is to secure that municipal and other public works shall be supervised by duly qualified consulting engineers; and in order that this may be done, it is necessary to know who is so qualified. There appear to be no means of ascertaining this at the present time; and it is hoped that the register of the Association will give the information. The Association will not be antagonistic to the principle of specialization, as the intention is to include all branches of the profession—civil, mechanical, electrical, gas, and possibly others. It is not suggested that every member should possess a knowledge of all branches, or even of more than one; all that is proposed is for every member to be a properly trained and qualified engineer, and that he shall act solely in a professional capacity—that is, as a consulting engineer. It is not intended to encroach in any way on the authority of the councils of the leading institutions which deal with the different branches of engineering.

The bye-laws governing professional conduct issued by the Institution of Civil Engineers, and now adopted also by the Institution of Electrical Engineers, require that the members of these Institutions, when acting in a "professional capacity"—that is, as consulting engineers—shall conform to certain rules. The above Institutions cannot make any distinction between their members, and are therefore not able to say to which of them the rules are applicable. The register of the Association will, it is hoped, form a complete list of the qualified consulting engineers to whom these rules will be applicable at all times. The register will be open to inspection by authorities who are responsible for spending public money, as well as to anyone else requiring the advice of a consulting engineer. The rules of the Association, which are now under consideration, will be based on the above-mentioned rules, to which it is intended to add others applicable to consulting engineers only. These rules will be submitted to a general meeting in the autumn. At present, membership of the Association is confined to those who are corporate members of the Institution of Civil Engineers and also of the Institution representing the particular branch of the profession in which they now practice. The Association is not prepared at present to accept the responsibility of considering the qualifications of engineers other than those already mentioned; but it will no doubt be able to do so in the future, should it receive the support it desires from all members of the profession.

Recent Wills.—Major Philip Cardew, for some time Electrical Adviser to the Board of Trade, whose death occurred on the 17th of May last, left estate of the gross value of £30,332. His Honour John Shiress-Will, County Court Judge for Birkenhead since 1906, and Editor of the two works on the law of gas and water supply and electric lighting with which his name is associated, left estate valued at £2300 gross, of which £2220 is net personalty.

Use of Tar for Road Surfaces.—In the "Journal" last week, a description was given of the Paignton Water-Works by Mr. C. Owen Baines, the Engineer and Surveyor to the Urban District Council. It was extracted from a paper read by him at a district meeting of the Institution of Municipal Engineers held in the town. In the same paper the author referred to the use of tar for road making. Crude tar from the gas-works was mixed with distilled tar in proportions varying between 1 to 3 and 1 to 6, depending upon the quality and the consistency of the crude tar. The cost per superficial yard was ¾d., sometimes more, according to the distance from depôts. About 460 gallons of tar were usually disposed of in a day's work; and the tarred area was sanded in addition. The author said it was absolutely essential for successful tar-spraying to have a good and dry surface, clean and free from dirt of every kind. The road should be swept again with a horse broom; and even then a man should follow to clear off anything of an adhesive nature.

GASHOLDER CUPS.

By F. Southwell Cripps, Assoc.M.Inst.C.E.

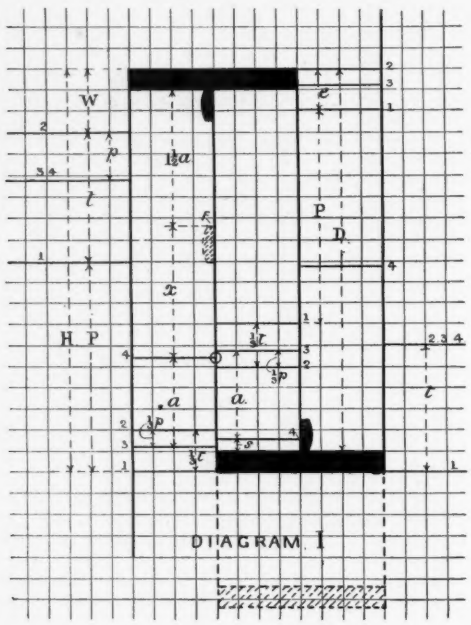
[Third Article.]

In the second article on this subject (Vol. CX., p. 368), formulæ were given for solving the various problems relating to the "blowing" of gasholder cups. These problems were, for the most part, treated graphically in the first article. In this, the third article, the construction or evolution of the formulæ is given.

Evolution of Formulæ.

Case I.—Taking example 3 of the first article [Vol. CX., p. 28], draw the diagram showing respective stages of water levels 1, 2, 3, 4, as in fig. 7 in that article, but repeated below with the notation given on p. 368 of the second article. The data given for this example are:

$P = 10''$, $H = 19''$, $e = 2''$, $S = \frac{1}{2}''$, $D = 18''$, $W = 3''$, $p = 2\frac{1}{4}''$



By inspection, we see that

$$t = H - W - P$$
$$a = D - e - P - S - \tfrac{1}{3}t + \tfrac{1}{3}p$$
$$x = D - 2\tfrac{1}{2}a - \tfrac{1}{3}t + \tfrac{1}{3}p.$$

Now filling in values of a and t, we have

$$x = D - 2\tfrac{1}{2}\left(D - e - P - S - \frac{H - W - P}{3} + \frac{p}{3}\right) - \frac{H - W - P}{3} + \frac{p}{3}$$

$$= D - 2\tfrac{1}{2}\left(D - e - P - S - \frac{H}{3} + \frac{W}{3} + \frac{P}{3} + \frac{p}{3}\right) - \frac{H}{3} + \frac{W}{3} + \frac{P}{3} + \frac{p}{3}$$

$$= D - 2\tfrac{1}{2}D + 2\tfrac{1}{2}e + 2\tfrac{1}{2}P + 2\tfrac{1}{2}S + \frac{5}{6}H - \frac{5}{6}W - \frac{5}{6}P - \frac{5}{6}p - \frac{H}{3} + \frac{W}{3} + \frac{P}{3} + \frac{p}{3}$$

$$= -1\tfrac{1}{2}D + 2\tfrac{1}{2}e + 2P + 2\tfrac{1}{2}S + \tfrac{1}{2}H - \tfrac{1}{2}W - \tfrac{1}{2}p.$$

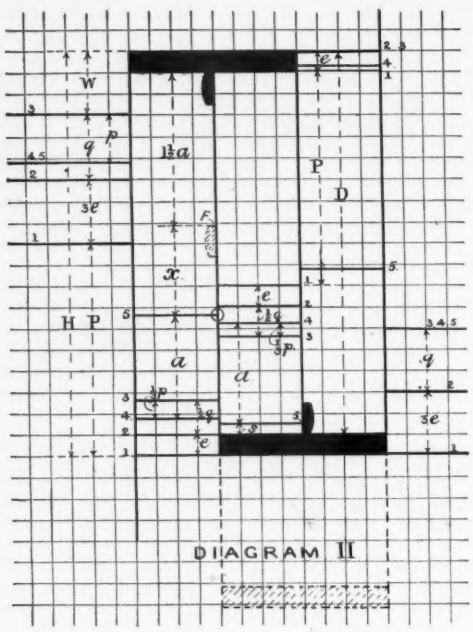
Bringing all to a common denominator, and separating the *plus* and *minus* quantities, we have

$$x = \frac{4P + 5e + 5S + H - 3D - W - p}{2},$$

which is the formula given in the second article for case 1 (p. 369).

Case II.—Taking particulars from example 4 in the first article (p. 29), we have the successive water levels as shown in Diagram II., for Case II. The data given are:

$P = 10''$, $H = 19''$, $e = 1''$, $S = \frac{1}{2}''$, $D = 18''$, $W = 3''$, $p = 2\frac{1}{4}''$.



By inspection of the diagram, we see that

$$q = H - W - P - 3e$$
$$a = D - 2e - P - S - \tfrac{1}{2}q + \tfrac{1}{3}p$$
$$x = D - 2\tfrac{1}{2}a - e - \tfrac{1}{2}q + \tfrac{1}{3}p.$$

Hence, filling in values of q and a, we have

$$x = D - 2\tfrac{1}{2}\left(D - 2e - P - S - \frac{H - W - P - 3e}{2} + \tfrac{1}{3}p\right) - e - \frac{H - W - P - 3e}{2} + \tfrac{1}{3}p$$

$$= D - 2\tfrac{1}{2}D + 5e + 2\tfrac{1}{2}P + 2\tfrac{1}{2}S + 1\tfrac{1}{4}H - 1\tfrac{1}{4}W - 1\tfrac{1}{4}P - 3\tfrac{3}{4}e - \tfrac{5}{6}p - e - \frac{H}{2} + \frac{W}{2} + \frac{P}{2} + \frac{3e}{2} + \frac{p}{3}$$

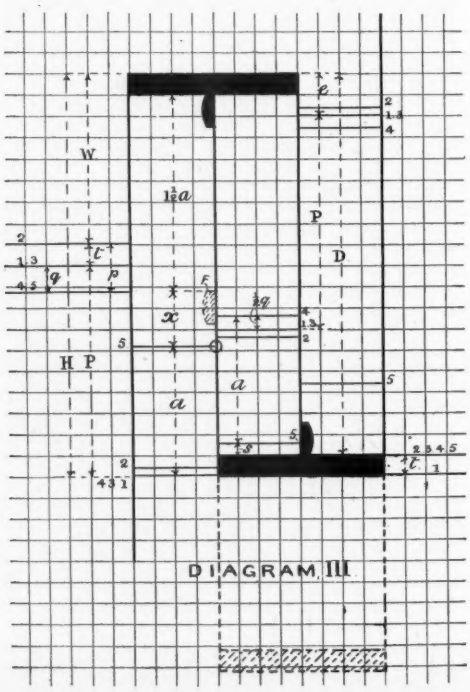
$$= -1\tfrac{1}{2}D + 1\tfrac{3}{4}e + 1\tfrac{3}{4}P + 2\tfrac{1}{2}S + \tfrac{3}{4}H - \tfrac{3}{4}W - \tfrac{1}{2}p.$$

Therefore $x = \dfrac{7P + 3H + 7e + 10S - 6D - 3W - 2p}{4}$,

which accords with formula for Case II. already given in the last article (p. 369).

Case III.—See example 5 (p. 29) for data and water levels. The successive water levels during the uncupping are shown on Diagram III. below, the data for which are as follows:

$P = 10''$, $H = 19''$, $e = 2''$, $S = \frac{1}{2}''$, $D = 18''$, $W = 8''$, $p = 2\frac{1}{4}''$.



From inspection, we see

$$t = H - W - P$$

and $q = p - t$

$$\therefore q = p - H + W + P$$

and $a = D - e - P - S + \frac{q}{2}$

also, $x = D - 2\frac{1}{2}a$

$$\therefore x = D - 2\tfrac{1}{2}\left(D - e - P - S + \frac{q}{2}\right)$$

or $x = -1\frac{1}{2}D + 2\frac{1}{2}e + 2\frac{1}{2}P + 2\frac{1}{2}S - 1\frac{1}{4}q.$

Filling in value of q (as above), we have

$$x = -1\tfrac{1}{4}D + 2\tfrac{1}{2}e + 2\tfrac{1}{2}P + 2\tfrac{1}{2}S - 1\tfrac{1}{4}p + 1\tfrac{1}{4}H - 1\tfrac{1}{4}W - 1\tfrac{1}{4}P$$
$$= -\tfrac{3}{2}D + \tfrac{5}{2}e + \tfrac{5}{4}P + \tfrac{5}{2}S - \tfrac{5}{4}p + \tfrac{5}{4}H - \tfrac{5}{4}W.$$

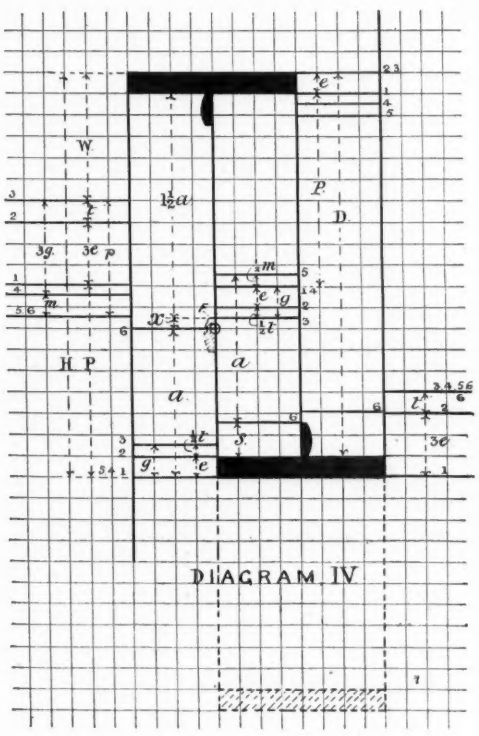
Therefore $x = \dfrac{5P + 5H + 10e + 10S - 6D - 5W - 5p}{4}$

as given in previous article (p. 369).

Case IV.—This was not worked in the first article, as it seldom arises in practice; and it is a combination of Cases II. and III. Taking the same cup as before, but altering the water levels, we will assume the following :—

$P = 9''$, $H = 19''$, $e = 1''$, $S = 1\frac{1}{2}''$, $D = 18''$, $W = 6''$, $p = 5{\cdot}5$.

[Note.—These dimensions are unlikely to occur in practice, but are selected to render the process clear.]



The successive stages being shown on Diagram IV., as numbered. We see by inspection that the following hold good :—

$$x = D - 2\tfrac{1}{2}a$$

But $a = D - e - P + \frac{1}{3}m - S$

$$\therefore x = D - 2\tfrac{1}{2}(D - e - P + \tfrac{1}{3}m - S)$$

But $m = p - 3g$, and $g = e + \frac{1}{2}t$

Now $t = H - W - 3e - P$

$$\therefore g = e + \frac{H - W - 3e - P}{2}$$

Hence $m = p - 3\left(e + \dfrac{H - W - 3e - P}{2}\right)$.

Now filling in the value of m in the formula for x above, we have

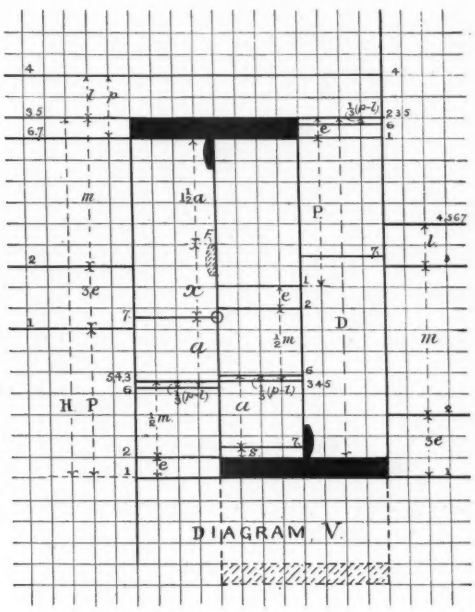
$$x = D - 2\tfrac{1}{2}\left[D - e - P + \tfrac{1}{2}\left\{p - 3\left(e + \frac{H - W - 3e - P}{2}\right)\right\} - S\right]$$
$$= D - 2\tfrac{1}{2}D + 2\tfrac{1}{2}e + 2\tfrac{1}{2}P - 1\tfrac{1}{4}p + 3\tfrac{3}{4}e + 1\tfrac{7}{8}H - 1\tfrac{7}{8}W - 5\tfrac{5}{8}e - 1\tfrac{7}{8}P + 2\tfrac{1}{2}S$$
$$= -1\tfrac{1}{2}D + \tfrac{5}{8}e + \tfrac{5}{8}P - 1\tfrac{1}{4}p + 1\tfrac{7}{8}H - 1\tfrac{7}{8}W + 2\tfrac{1}{2}S.$$

Therefore, $x = \dfrac{5P + 15H + 5e + 20S - 12D - 15W - 10p}{8}$

as given in the last article (p. 369).

Case V.—Taking the data given for Example 5 on p. 369 of the previous article, we have the various water levels as indicated in Diagram V. below. The data are as follows :—

$P = 7''$, $H = 17''$, $e = 1''$, $S = \frac{1}{2}''$, $D = 16''$, $W = 0$, $p = 3''$, $l = 2''$



From inspection, we see that

$$x = D - e - 2\tfrac{1}{2}a - \tfrac{1}{3}m + \tfrac{1}{3}(p - l)$$

but $a = D - 2e - P - S - \frac{1}{3}m + \frac{1}{3}(p - l)$

and $m = H - P - 3e$

$$\therefore a = D - 2e - P - S - \tfrac{1}{2}H + \tfrac{1}{2}P + 1\tfrac{1}{2}e + \tfrac{1}{3}p + \tfrac{1}{3}l$$

and $x = D - e - 2\frac{1}{2}D + 5e + 2\frac{1}{2}P + 2\frac{1}{2}S + 1\frac{1}{4}H - 1\frac{1}{4}P - 3\frac{3}{4}e - \frac{5}{6}p + \frac{5}{6}l - \frac{1}{2}H + \frac{1}{2}P + 1\frac{1}{2}e + \frac{1}{6}p - \frac{1}{6}l.$

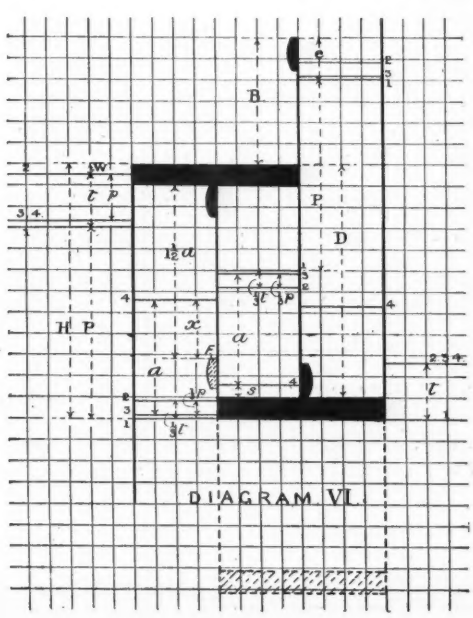
$$= -1\tfrac{1}{2}D + 1\tfrac{3}{4}e + 1\tfrac{3}{4}P + 2\tfrac{1}{2}S + \tfrac{3}{4}H - \tfrac{1}{2}p + \tfrac{1}{2}l.$$

Therefore, $x = \dfrac{7P + 3H + 7e + 10S + 2l - 6D - 2p}{4}$

This accords with the formula for Case V. in the last article (p. 369).

Case VI.—This is the first case for *shallow cups* with raised grip plate. The particulars are taken from Example 6 in the last article (p. 369), except that W is $\frac{1}{2}$ inch instead of zero, to render the process clear. Diagram VI. is constructed from the following data, and the water levels indicated thereon.

$P = 9''$, $H = 12''$, $e = 2''$, $S = \frac{1}{2}''$, $D = 11''$, $W = \frac{1}{2}''$, $p = 2\frac{1}{4}''$, $B = 6''$.



From inspection, we note that

$$t = H - W - P$$
$$a = D + B - e - P - S - \tfrac{1}{3}t + \tfrac{1}{3}p$$
$$x = D - 2\tfrac{1}{2}a - \tfrac{1}{3}t + \tfrac{1}{3}p$$
$$\therefore x = D - 2\tfrac{1}{2}\left(D + B - e - P - S - \tfrac{1}{3}t + \tfrac{1}{3}p\right) - \tfrac{1}{3}t + \tfrac{1}{3}p$$

Filling in the values of t and p, we have

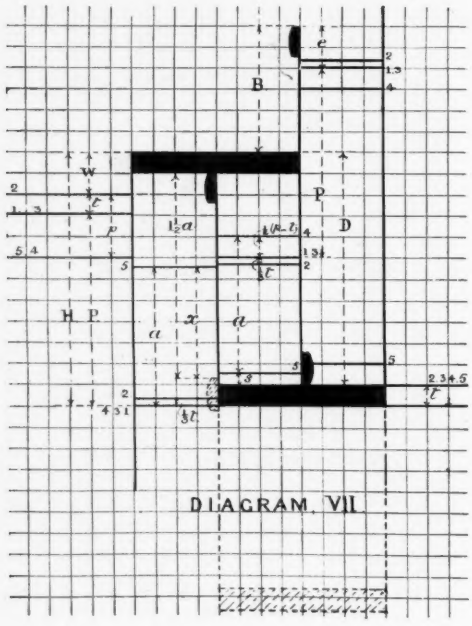
$$x = D - 2\tfrac{1}{2}\left(D + B - e - P - S - \frac{H - W - P}{3} + \frac{p}{3}\right) - \frac{H - W - P}{3} + \frac{p}{3}$$
$$= D - 2\tfrac{1}{2}D - 2\tfrac{1}{2}B + 2\tfrac{1}{2}e + 2\tfrac{1}{2}P + 2\tfrac{1}{2}S + \tfrac{5}{6}H - \tfrac{5}{6}W - \tfrac{5}{6}P - \tfrac{5}{6}p - \frac{H}{3} + \frac{W}{3} + \frac{P}{3} + \frac{p}{3}$$
$$= -1\tfrac{1}{2}D - 2\tfrac{1}{2}B + 2\tfrac{1}{2}e + 2P + 2\tfrac{1}{2}S + \tfrac{1}{2}H - \tfrac{1}{2}W - \tfrac{1}{2}p.$$

Therefore, $x = \dfrac{4P + H + 5e + 5S - 3D - W - p - 5B}{2}$

which is the formula given on p. 369 of the last article for Case VI.

Case VII.—Taking Example 7 of the second article (p. 370), the water levels are shown in Diagram VII. to accord with the various stages of uncupping according to the directions set forth in the first article. Repeating the data, we have,

$P = 9''$, $H = 12''$, $e = 2''$, $S = \tfrac{1}{2}''$, $D = 11''$, $W = 2''$, $p = 3''$, $B = 6''$.



We find from inspection that

$$t = H - P - W$$
$$a = D + B - e - P - S + \tfrac{1}{2}(p - t)$$
$$x = D - 2\tfrac{1}{2}a$$
$$= D - 2\tfrac{1}{2}\left\{D + B - e - P - S + \tfrac{1}{2}(p - t)\right\}$$
$$= D - 2\tfrac{1}{2}\left\{D + B - e - P - S + \frac{p}{2} - \frac{H}{2} + \frac{P}{2} + \frac{W}{2}\right\}$$
$$= D - 2\tfrac{1}{2}D - 2\tfrac{1}{2}B + 2\tfrac{1}{2}e + 2\tfrac{1}{2}P + 2\tfrac{1}{2}S - 1\tfrac{1}{4}p + 1\tfrac{1}{4}H - 1\tfrac{1}{4}P - 1\tfrac{1}{4}W$$
$$= -1\tfrac{1}{2}D - 2\tfrac{1}{2}B + 2\tfrac{1}{2}e + 1\tfrac{1}{4}P + 2\tfrac{1}{2}S - 1\tfrac{1}{4}p + 1\tfrac{1}{4}H - 1\tfrac{1}{4}W.$$

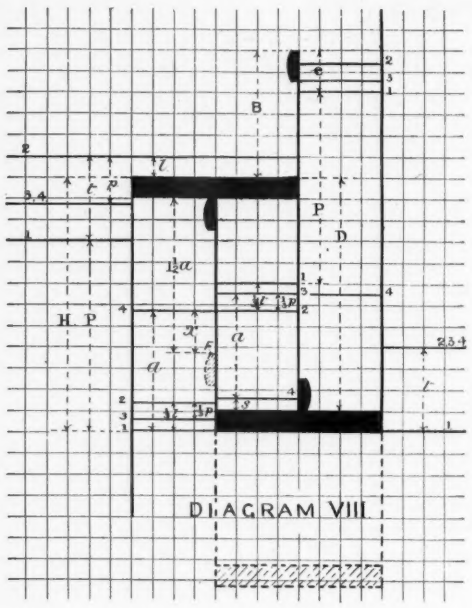
Therefore, $x = \dfrac{5P + 5H + 10e + 10S - 6D - 5W - 5p - 10B}{4}$

which agrees with Formula VII. in the previous article (p. 369).

Case VIII.—The data given in Example 8 of the second article (p. 370) are taken for this case—viz.:

$P = 9''$, $H = 12''$, $e = 2''$, $S = \tfrac{1}{2}''$, $D = 11''$, $l = 1''$, $p = 2\tfrac{1}{4}''$, $B = 6''$.

The successive water levels, due to uncupping, are shown to accord with same in Diagram VIII.



From inspection, we see that

$$t = H - P + l$$
$$a = D + B - e - P - S - \tfrac{1}{3}t + \tfrac{1}{3}p$$

and $x = D - 2\tfrac{1}{2}a - \tfrac{1}{3}t + \tfrac{1}{3}p$

$$\therefore \quad x = D - 2\tfrac{1}{2}\left(D + B - e - P - S - \frac{H - P + l}{3} + \tfrac{1}{3}p\right) - \tfrac{1}{3}t + \tfrac{1}{3}p$$
$$= D - 2\tfrac{1}{2}\left(D + B - e - P - S - \frac{H}{3} + \frac{P}{3} - \frac{l}{3} + \frac{p}{3}\right) - \frac{H}{3} + \frac{P}{3} - \frac{l}{3} + \frac{p}{3}$$
$$= D - 2\tfrac{1}{2}D - 2\tfrac{1}{2}B + 2\tfrac{1}{2}e + 2\tfrac{1}{2}P + 2\tfrac{1}{2}S + \tfrac{5}{6}H - \tfrac{5}{6}P + \tfrac{5}{6}l - \tfrac{5}{6}p - \frac{H}{3} + \frac{P}{3} - \frac{l}{3} + \frac{p}{3}$$
$$= -1\tfrac{1}{2}D - 2\tfrac{1}{2}B + 2\tfrac{1}{2}e + 2P + 2\tfrac{1}{2}S + \tfrac{1}{2}H + \tfrac{1}{6}l - \tfrac{1}{2}p$$

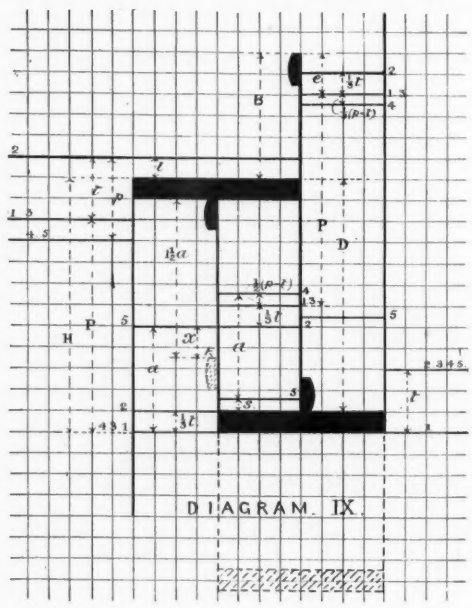
Therefore, $x = \dfrac{4P + H + 5e + 5S + l - 3D - p - 5B}{2}$.

This is identical with Formula VIII. on p. 369 of previous article.

Case IX.—The data in this case are the same as in Example 9 (p. 370)—viz:

$P = 10''$, $H = 12''$, $e = 2''$, $S = \tfrac{1}{2}''$, $D = 11''$, $l = 1''$, $p = 4''$, $B = 6''$.

The successive water levels are shown in Diagram IX. below.



From inspection, we see that

$$t = H + l - P$$
$$a = D + B - P - e - S + \tfrac{1}{2}(p - t)$$

and $x = D - 2\frac{1}{2}a$

$$\therefore x = D - 2\tfrac{1}{2}\left(D + B - P - e - S + \frac{p}{2} - \frac{H}{2} - \frac{l}{2} + \frac{P}{2}\right)$$

$$\text{or } x = \frac{5P + 5H + 10e + 10S - 6D + 5l - 5p - 10B}{4}$$

which agrees with Formula IX on p. 369 of previous article.

The determination of the various problems by the graphical method is somewhat complicated, and unless very great care is taken, it is easy for errors to creep in. It is therefore important that the results obtained graphically should in all cases be checked by the formulæ.

The application of the formulæ presented in these articles is so exceedingly simple that no one need hesitate to grapple with them when desirous of determining whether or no a gasholder cup will blow gas to waste during the process of uncupping.

Concluding Remarks.

Much might be said on the treatment of gasholder cups, and matters akin to them; but it would be beyond the scope of the present articles. Before leaving the subject, however, it may be well to call attention to a few important points too frequently lost sight of.

(1) *Level of Water in the Tank.*—When putting a new gasholder into action, it is almost the universal practice to fill the tank with water to the overflow level before the gasholder rises, or at the best the inner lift alone is suspended. As a consequence, a large quantity of water is run to waste when the holder is inflated. When the entire holder is empty and at rest in the tank, a gasholder tank should be filled short of the overflow level by a depth equal to the pressure given by the entire holder when inflated. If the whole gasholder is on the rest-stones, and the pressure it would give when inflated would be 10 inches, then the water should not be higher than 10 inches below the overflow. Then, when the holder is giving its full pressure, the water outside will rise to the overflow level, without any waste.

(2) *Level of Vent Pipes in Crown of Gasholder.*—When filling a gasholder with gas for the first time, it is important that the vent pipe or pipes for the emission of air from the crown of the holder should reach within an inch or two of the actual water level inside the holder. The holder being at rest, this water level should be below the overflow level by a distance equal to the pressure given by the holder when fully inflated. It would not be sufficient to let the air vent pipe reach within a few inches of the overflow level, but of the *actual* water level, which is, or should be, below this.

> Note.—Of course, if the tank has been filled too full of water, contrary to the directions given above, this rule requires modification.

(3) *Testing Cups for Soundness.*—It is very important to remember, in testing a gasholder for soundness, that the grips should be specially tested during the action of cupping and uncupping, as it is at such times that they have to resist the greatest pressure of gas or air. It is not sufficient to test them when the holder is fully inflated, because the pressure in the grips is not then nearly so great as during the time of cupping and uncupping. Much greater attention should be paid to the testing of cups and grips than is ordinarily the case. Of course, when testing for soundness, the greater the pressure that can be put on the grips the better.

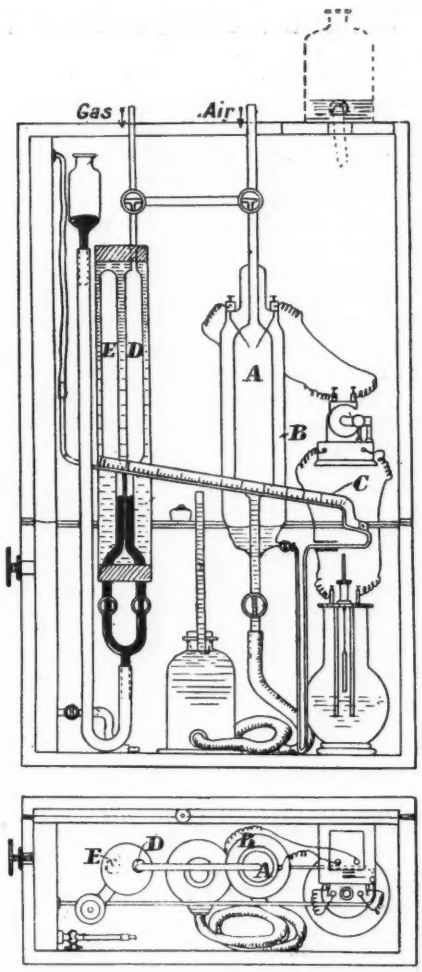
∴ Erratum. First article, Vol. CX., p. 370. Example 8. for $x = -1\frac{3}{8}$, read $x = -1\frac{7}{8}$.

THE STRACHE GAS CALORIMETER.

A calorimeter designed by Dr. H. Strache, Professor at the Technical College at Vienna, embodies a different principle from those hitherto employed. A description of it—taken from the "Journal für Gasbeleuchtung"—was circulated at the meeting of the German Association of Gas and Water Engineers held at Königsberg this summer.

The Junkers and similar calorimeters, which determine the increase of temperature of a uniform stream of water due to the heat from a gas-flame burning at a uniform rate, necessarily require a water supply and waste pipe; and they cannot, therefore, be employed where these are not available. Other types of gas calorimeter depend on the determination of the radiation from a body heated by a gas-flame; but these are liable to inexactness in consequence of changes in the surface of the body and in the air currents. The Strache calorimeter dispenses with a water supply, and is stated to give exact results.

The Strache calorimeter consists (as shown) of an explosion pipette A surrounded by a glass jacket B, the expansion of the air in which can be measured on a sensitive pressure-gauge C. A burette D is used to measure off a known volume of the gas to be tested; and this volume is passed into the explosion pipette, and burned with a sufficient quantity of air. The burette is placed alongside, and its mercury seal is in communication with



a similar tube E containing a volume of air equal to 30 c.c., at standard temperature and pressure. The volume of gas taken in the burette is such as to balance the pressure of the air contained in the control tube; so that it is known forthwith that the volume of gas taken for the explosion is exactly equal to 30 c.c. in standard conditions of temperature and pressure. Correction of the volume by calculation is thus avoided. The heat evolved by the combustion of the 30 c.c. of gas in the explosion pipette is communicated to the air in the jacket of the double-walled explosion vessel and causes the air to expand. The degree of its expansion is a measure of the heat communicated to it, and is ascertained by the readings of the pressure-gauge, which is in communication with the air in the jacket. The whole apparatus is arranged compactly in a portable case resembling that of the various forms of Orsat's or Haldane's gas analysis apparatus.

The advantages claimed for the Strache calorimeter are:

(1) Independence of water supply, waste pipe, or other permanent fittings.
(2) Portability and ease of employment at any spot.
(3) Small amount of gas—viz., 30 c.c.—which is required for a determination.
(4) Rapidity with which a determination can be made; the time occupied being from three to five minutes.
(5) Simplicity and low cost of the apparatus, as compared with calorimeters which require a water supply and gas-meter and governor.
(6) Exactness of results.
(7) Independence of observations of temperature and barometric pressure.

A number of examples of determinations are given in the paper from which this description of the apparatus is taken, showing that concordant results are obtained in successive determinations on the same sample of gas.

Synthesis of Methane.—At a recent meeting of the Chemical Society, Messrs. W. A. Bone and Hubert F. Coward stated that, as the result of a continuation of their previous experiments, they were able to report a not less than 95 per cent. yield of methane from less than 0·03 gramme of highly purified sugar charcoal (containing not more than 0·06 per cent. of ash and less than 0·1 per cent. of hydrogen) by maintaining it in a steady current of pure, dry hydrogen at 1150° for 17 to 25 hours continuously; thus completing the proof of the direct synthesis of methane from its elements at this temperature.

RETORTS v. LARGE CHAMBERS.

In the "JOURNAL" last week (p. 324), we gave a summary of a paper on the above subject read by Dr. R. Geipert at the meeting of the Association of Gas and Water Engineers of Austria-Hungary. A paper was read at the same meeting by Herr O. Peischer, the Manager of the Innsbruck Gas-Works, giving a descriptive account of the new municipal works of the town, with special reference to the installation of horizontal carbonizing chambers. These chambers have been already described in the "JOURNAL" for April 26 last (p. 231); and the results of an eleven-days' trial run and of three months' regular working were then given. Much of the matter contained in Herr Peischer's paper before the Innsbruck meeting has, therefore, already been brought to the notice of readers of the "JOURNAL." There is, however, a certain amount of fresh information; in particular, the report of the further experience gained since the first three months of the working of the new settings.

The results of six months' working of the chambers show an average make of gas of 11,052 cubic feet per ton. The gross calorific power of the gas made averaged, on 488 tests, 613 B.Th.U. per cubic foot; and the net calorific power 562 B.Th.U. per cubic foot. There were put into the chambers in this time 1695 charges in place of a possible maximum of 1950; so that the settings were only actually utilized to 87 per cent. of their possible capacity. The fuel consumption was accordingly relatively high—viz., 16·5 per cent. of the weight of coal carbonized, or 31·2 lbs. of wet coke per 1000 cubic feet of gas made. The tar produced amounted to 5·4 per cent. of the weight of coal carbonized. Less than 1 per cent. of the tar made was thick tar or pitch. The tar had a specific gravity of 1·06 and was of a freely fluid, oily character. It was applied directly for heating boilers by means of the pipes and jets used for crude oil. The coke was somewhat harder and in larger lumps than ordinary retort coke, but rather less hard than vertical retort coke. The gas produced varied in calorific power at times from 393 to 640 B.Th.U per cubic foot; but the different grades mixed quite well in a single gasholder, and the daily variations in the calorific power of the gas distributed were ordinarily no greater than 23–34 B.Th.U. per cubic foot. Such fluctuations caused no trouble to consumers.

Practically no scurf was formed in the retorts. The ascension pipes were burnt through before each charging; and in cases where the charges had not been completely burned off, a good deal of smoke was thus produced, which it would be desirable to lead into a lofty flue. There were no cases of stopped ascension pipes. The coke was discharged from the horizontal chambers by means of an electrically driven machine. This has worked perfectly during the six months except that on three occasions small points which needed attention were dealt with during the night-time when it was not in use. A pressure gauge is attached to each ascension pipe, so that the pressure in each chamber can be constantly observed. It is maintained at 0 to 2½-10ths, either by varying the dip or by opening a bye-pass valve which allows the gas to go direct into the foul main without passing through the dip. There is telephonic communication between the carbonizing stage and the engine-house, so that the exhausters may be regulated according to the instructions of the carbonizing foreman who observes the pressure gauges and the records of calorific power. The make of gas per man per shift would, with the addition of another setting, amount to 56,500 cubic feet, which is a great advance on what had been accomplished with the old retorts. The figure is not really comparable with a corresponding figure of 247,000 cubic feet quoted by Herr Weiss, of Zürich, for his settings of vertical retorts, because his figure does not include attendance on the furnaces, and applies to a much larger installation.

It is a truism that the smaller the installation the higher are the wages relatively to the make of gas. A vertical retort installation of the same productive capacity as the carbonizing chamber plant at Innsbruck would have cost £8300 more than the latter; and the interest and depreciation charges on this additional expenditure would have been about £800 a year more, which, at the rates of pay which prevail at Innsbruck, would have served to pay seven men for one shift per diem, or for the requisite attendance on three settings of carbonizing chambers. A comparison instituted between the settings of 18 vertical retorts and the horizontal chambers at Innsbruck, which makes out that only three men are required to produce the same amount of gas with the vertical retorts as 32 men with the carbonizing chambers, is invalidated, not only by the difference in the sizes of the installations on which the figures are based, but by the fact that the labour reckoned for the vertical retorts is only that required for charging and discharging them; whereas the figures for the carbonizing chambers comprise the whole labour employed in the carbonizing house. Such comparisons, to be of any value, must be made on absolutely the same basis; and the cost of the installation must be also taken into account.

The discussion on the papers read by Dr. Geipert and Herr Peischer was opened by Herr F. Bössner, the Chief Engineer of the Municipal Gas Undertaking, of Vienna, who contended that the vertical retorts should be compared with carbonizing chambers on the basis of their working without steaming. Thus Herr Delbruck had pointed out that, as a mean of the results obtained with Dessau vertical retorts at Mariendorf, Zürich, Cologne, and Dessau, the make of gas per ton of coal was 11,690 cubic feet, and the coke consumed as fuel amounted to 14·62 per cent. of the weight of coal carbonized. ["JOURNAL," Vol. CX., p. 500.] On the other hand, Herr Krause, the Manager of the Hamburg Gas-Works, states that for the Munich chamber settings at his works a yield of 11,840 cubic feet of gas per ton of coal, with a fuel consumption of 14 per cent., was guaranteed. The high yield actually obtained at Hamburg was verified by the speaker from the works' books in the summer of 1909. The inclined carbonizing chambers at the Vienna works in two carefully checked trials of six days each, with a pressure of 2-10ths in the ascension pipes and using very wet coal, gave a make of 12,093 cubic feet per ton of coal; the gross calorific power of the gas being 573 B.Th.U. per cubic foot. The coke consumed in the producers amounted to 14·2 per cent. of the weight of coal carbonized. It would thus appear that the carbonizing chambers are not inferior to vertical retorts as apparatus for the distillation of coal.

The fuel item for vertical retorts, when worked with steaming, should include the fuel consumed in producing the steam as well as the coke consumed in the retorts according to the water gas reaction. Delbruck gave the average make of gas in vertical retorts with steaming at 13,592 cubic feet per ton, and the fuel consumption at 15·7 per cent. The difference between the make of gas with and without steaming is, therefore, 13,592 − 11,698 = 1894, or nearly 1900 cubic feet per ton; and the carbon contained in this amount of gas, and the steam (taken at double the theoretical quantity) admitted, would entail a consumption of coke equivalent to 2·44 per cent. of the weight of coal carbonized—making the total coke consumed in the working of vertical retorts with steaming equal to 15·7 per cent. + 2·44 per cent = 18·14 per cent. The comparative figures for fuel consumption therefore appear to be as follows:—

Vertical retorts without steaming	28·0	Pounds per 1000 cubic feet.
Carbonizing chambers	26·5	
Vertical retorts with steaming (Delbruck's figures + 2·44 per cent.)	29·9	
Vertical retorts with steaming (Geipert's figures + 2·44 per cent.)	23·8	

The last-named figure represents the latest achievement of the vertical retorts; but it must not be supposed that the carbonizing chambers have not also made progress. At Vienna, horizontal chamber settings are in course of erection for which the fuel consumption is guaranteed not to exceed 12 lbs. of dry coke per 100 lbs. of coal carbonized. This is equivalent to 22·6 lbs. of coke per 1000 cubic feet of gas made. The guarantee applies to small coke, which has only one-half the value of large coke in Vienna. Moreover, the fuel guarantee refers to a whole year's working of the chambers, and not merely to a supervised trial of one or two days' duration.

In regard to the labour required, the make per man per shift with vertical retorts is put at 600,000 cubic feet. But this refers only to retort-house labour proper, and 14 per cent. of the make is water gas, which may be regarded as produced by the boiler attendants instead of by the retort-stokers. Hence the make per stoker per shift becomes really 515,000 cubic feet. At Hamburg, the labour for a make of 3½ million cubic feet with the chambers is guaranteed at not more than ten men, of whom five may be regarded as furnace men and five as employed on the chambers on the same basis as the labour is reckoned for the vertical retorts. Hence the corresponding figure for the chambers is a make of 705,000 cubic feet per man per shift. The inclined chambers at present in use in Vienna make 307,000 cubic feet per man; but when they are provided with self-sealing lids, so that luting is no longer necessary, the make per man will be at least 565,000 cubic feet. Hence the large carbonizing chamber need not retire before the latest type of vertical retort-setting. The large charge makes for economy of labour. The charge per chamber is 6 to 9 tons; that of three retorts (charged simultaneously) in the setting of eighteen verticals, about 1½ tons. Hence the number of charges is with chambers a fourth to one-seventh that with vertical retorts. It is interesting in this connection to remember Mr. E. Körting's statement that the Men's Union at Genoa has settled that 17 men shall be engaged per 24 hours on the setting of 60 vertical retorts there, as compared with the six men required for 120 to 180 retorts in Berlin. As the retorts are charged twice in 24 hours, each man at Genoa accomplishes only 7·12 retort-charges, against 60 charges in Berlin. It is much easier for a workmen's union to enforce an increase of the staff employed with vertical retorts than with chambers, having regard to the smaller number of charges with the latter and the fact that all the charging is done in the day time. In the speaker's opinion, the chamber not only is not inferior to the vertical retort, but is destined to have the future to itself.

Herr Bennighoff, of the firm of Aug. Klönne, of Dortmund, was the next speaker. He said that his firm had erected three types of chamber settings—viz., horizontal, inclined, and vertical—all of which had now been in use for a long time; but the results had taught that the horizontal were the simplest and the best. The horizontal chambers as erected at Rotterdam two years ago had been copied, after inspection, at Padua, Rixdorf, and Frankenthal. At Padua, Holmside (Durham) coal was used; at Rixdorf, a mixture of New Leverson and Upper Selesian; at Frankenthal, Saar coal; and at Rotterdam, English and Westphalian. The makes quoted by Herr Peischer were not high for Saar coal; but, owing

to the elevated position of Innsbruck, he probably found it necessary to manufacture gas of high calorific power, and be content with a comparatively small make. At Frankenthal, Saar coal in the horizontal chambers, has given considerably higher makes—*e.g.*, on May 18 last, 12,810 cubic feet per ton, the gas having a gross calorific power of 587 B.Th.U. per cubic foot; on May 19, 13,491 cubic feet, of 590 B.Th.U.; on May 20, 13,617 cubic feet, of 603 B.Th.U.; and on May 21, 13,129 cubic feet, of 599 B.Th.U. With these high makes, the fuel (coke) consumption was naturally rather high—viz., 14·5 to 15·2 per cent. by weight of the coal carbonized. The horizontal chambers at Padua, on a six days' trial run, showed a make per ton of 12,200 cubic feet of gas, of 607 B.Th.U. gross calorific power, and 14·5 per cent. of coke consumed in the furnaces; those at Rixdorf, on a three days trial, a make of 12,020 cubic feet, of about 607 B.Th.U.. and 12·5 per cent. of fuel consumption. A four-weeks' trial run of the inclined chambers at Königsberg showed an average make of gas of 12,200 cubic feet of 607 B.Th.U., with 15 per cent. of fuel consumed. A vertical chamber setting at the Dortmund Gas-Works had been in use for 480 days; but it was worked with ten settings of Dessau vertical retorts, and the results could not be exactly ascertained for it alone. In a short time, however, this would be possible. The fuel consumption had, however, repeatedly been found to be 14 per cent., as compared with 18 to 19 per cent. for the vertical retort-settings.

The speaker had some doubts at first as to the results of entrusting the chamber settings at Padua to the care of the Italian workmen; but his doubts were quickly set at rest, as the installation was soon worked by them in a most exemplary manner. Ten minutes were occupied in charging a chamber; and the rate of production of gas was very uniform. With a make of 705,000 cubic feet per diem at Padua, the difference in the make per hour in the most extreme cases was only 7050 cubic feet. The speaker showed by a diagram that the calorific power of the gas was also very uniform. He had just returned from a three days' trial of the Padua settings in which observations made of the illuminating power of the gas, according to the French method, had been at intervals of ten minutes. The results had not been properly worked out yet; but the speaker could say that, with a make of gas of 12,020 cubic feet per ton, the quality varied from 110 to 60 litres per carcel—*i.e.*, from 2·52 to 4·62 candles per cubic foot. The figures quoted indicated that the large chamber was fully equal to the vertical retort. It was, of course, unfair to compare the labour required for an installation of chambers with vertical retort plant of double the productive capacity. The 1910 type of vertical-retort plant, of which one setting made 245,000 cubic feet of gas per diem, should be compared with a bed of chambers of similar capacity. Such chambers would be about 26 ft. 3 in. long; and three men would be able to make about 1,765,000 cubic feet with them, or nearly 600,000 cubic feet per man. The labour here taken into account was only that corresponding to the pure retort-house labour on which the calculations in regard to vertical retorts had been based—*viz.*, one man on the machine, one man on the top, and one man at the discharging side of the settings. Naturally the coal would be brought up to, and the coke taken away from, the settings by machinery. In Italy, more men were required than in Germany and Austria—partly owing to the climate, but partly also to their organization. At Padua, 62 men employed in the old retort-house had been displaced by 11 men, whose work included coal conveying, charging producers, clinkering, and all incidental carbonizing work; while the make of gas remained the same—*viz.*, 705,000 cubic feet per diem. All the chambers were charged between seven and eight o'clock in the morning, and two and three o'clock in the afternoon. There were three eight-hour shifts of two men each; and the other five men worked from seven to eleven o'clock in the morning and from two to six o'clock in the afternoon. Fewer men would be needed in Austria or Germany. The chambers were sound; and, as they worked under a positive pressure in any case, no flue gas was drawn into them. In order to adapt the working of large chambers to fluctuations in the demand for gas, the experiment was tried at Frankenthal of giving up Sunday work altogether; and the results had been quite satisfactory. The same experiment was about to be tried with the chambers at other places.

Dr. Strache, Professor at the Technical College at Vienna, said that vertical retorts and chambers must be compared on the same basis—either both without steaming or both with steaming. Also the make and calorific power should be stated at the same temperature and pressure for the volume of gas—Dr. Geipert took 0° C. and Herr Peischer 15° C. It should be settled once for all to what temperature the volume of gas in determinations of calorific power should be reduced. [This criticism does not generally apply to the abstract-translations of German and Austrian papers in the "JOURNAL" since, whether the basis adopted in the original is 0° C., 760 mm., and dry, or 15° C., 760 mm., and saturated, the English equivalents are invariably reckoned to 60° Fahr., 30 inches, and saturated; so that all the figures given may be strictly comparable. In a few cases, a little uncertainty is introduced, through the authors not clearly stating whether the gas has been measured at 0° or 15° C., and whether dry or saturated. —ED. J.G.L.] As to chambers and retorts, Dr. Geipert was not justified forthwith in condemning chambers because one trial which he had made had been unfavourable to them, while other investigators had obtained favourable results. The fact that ovens were preferred to retorts for producing metallurgical coke was a strong point in favour of the large chambers. The speaker would be glad if Herr Peischer would give the relative cost of horizontal and inclined chambers. The former would be cheaper as regards the setting alone; but a discharging machine was required. Did the work of the latter tend to make the chambers unsound? Some figures had been quoted which showed a higher calorific power for the gas made when the chambers were new than when they had been in use some time. Was the falling off in calorific power due to leaks in the chambers?

Herr A. Weiss, the Manager of the Zürich gas undertaking, said that the make of over 212,000 cubic feet per man per shift obtained at Zürich with vertical retorts with steaming had been arrived at after including the labour required for charging and clinkering the producers, as well as clearing the take-off pipes and lubricating the levers. This applied to eight-hour shifts—at the works where ten-hour shifts were still maintained, the make per man per shift would be higher. The make of gas per ton of coal, in the vertical retorts without steaming, was found to be about 8 per cent. higher than in the old inclined retort settings. The fuel consumption had remained at about the same figure (15 per cent.) taking the water gas made into account, and was therefore lower than that of the horizontal chambers at Innsbruck. The Zürich figures referred to Ruhr coal. Saar coal as used at Innsbruck should give a higher make per ton; and the 11,050 cubic feet attained there must be considered a low make per ton for that coal. The reduction in the formation of scurf probably was due to its combustion by air, which passed in while the doors were open for 1½ hours for charging the chambers and burning out the ascension pipes. The regulation of the pressure in the chambers appeared to require nice and troublesome adjustment. The repairing charges upon the vertical retorts might be said to be *nil*. The settings at Zürich had been in use about 1100 days, and the only repairs executed had been the renewal of two top lids of the retorts. The settings themselves were in normal condition. In comparing the initial cost of the different types of carbonizing plant, it should be definitely stated whether the cost of a retort-house had been included in each case. The cost of five settings of ten vertical retorts, stated by Herr Peischer at about £16,875, included a retort-house. The settings alone would cost about 20 per cent. less; and the outlay per 1000 cubic feet of productive capacity per diem would be reduced to about £25 3s. 6d. The new settings of 18 vertical retorts would cost about 10 per cent. more. But their productive capacity would be some 30 per cent. greater; so that they would result in a further economy of 20 per cent. The cost of the carbonizing plant would therefore become about £20 per 1000 cubic feet per diem productive capacity, as against about £23 12s. for chamber settings. Different views might be held as to whether a house was necessary for vertical retorts or chambers; but the advantages gained by the men at one time of the year through its absence were largely balanced by the disadvantages at another time. In Switzerland, it could not be dispensed with.

Herr Koppers, of Essen-on-the-Ruhr, wished to ask Dr. Geipert why the fuel consumption for the vertical retorts had not been determined, like the make of gas, on a seven days' trial, and why the producers had not been fed with the coke from the retorts. A desire to avoid disturbing the stable condition of the furnaces was hardly a sufficiently plausible reason for using other coke. It seemed more likely that the coal which gasified most readily had been chosen for charging the retort; and good, hard coke from other coal preferred as fuel for the producers. The Vertical Retort Company took care, when its agreements provided for a 14-day trial with penalties for non-fulfilment of the conditions of supply, only to guarantee a fuel consumption of 17 per cent. The report of the Düsseldorf Gas-Works gave a fuel consumption of 16·2 per cent. for the vertical retorts, 14·18 per cent. for the horizontals, and only 13·2 per cent. for the inclined retorts there. The same report stated also that the make per man per shift with the vertical retorts was 69,400 cubic feet. As to the fuel consumption with vertical retorts, a few gross examples might be quoted, viz.: At the Mariendorf works at Berlin, it was 13·5 to 14 per cent.; at the Oberspree works, 16 per cent.; at Frankfort-on-the-Maine, 16·9 per cent.; at Potsdam, 17·5 per cent.; at Charlottenburg, 19·5 per cent. No theoretical explanation that the fuel consumption with vertical retorts must be lower than with other types of setting could prevail in the face of these figures. After all, the fuel consumption depended on the efficiency of the recuperative system. At Düsseldorf, for instance, this was so low with the vertical retorts that the gases leaving the setting were taken to a boiler and gave a supply of high-pressure steam. It would be useful to have particulars of the temperature of the spent gases on the days when trials had been conducted on vertical retort-settings, as many deductions might be drawn therefrom. In regard to the investigations which had been made with a view to increasing the productive capacity of the vertical retorts, it appeared that in one case a large retort was tried, and in the other case three small retorts coupled together. It was found that the increase in the heating surface relatively to the amount of coal in the charge gave a higher efficiency. This conclusion was quite correct; but it applied only to vertical retorts. In carbonization, the gas passed away in the opposite direction to the inflow of heat—*i.e.*, to the heated walls, and then upwards. In vertical retorts, in particular, the column of coal or coke was enveloped by gas, which tended to resist the penetration of the applied heat. The larger the quantity of gas rising up between the charge and the heated walls, the greater would be its insulating effect, the higher would be the fuel consumption, and the

greater would be the pyrogenous decomposition resulting in the formation of much scurf on the walls, while the valuation figure—*i.e.*, product of make and calorific power—of the gas produced would be lower than was otherwise attainable. With horizontal chambers, a heating surface of 36 ft. by 8·2 ft. by 6·6 feet sufficed for carbonizing a charge of 12 metric tons of coal in twenty-four hours. This was equivalent to 51·4 square feet of heating surface per ton (English) of coal carbonized, which corresponded to a supply of heat of 1026 B.Th.U. per pound of coal. Taking the efficiency of the producer at 80 per cent., and the coke used as containing 10 per cent. of ash, the corresponding consumption of coke as fuel was equivalent to 10 per cent. of the weight of coal carbonized. These figures referred to horizontal chamber settings with regenerative firing as now employed. The settings of 18 vertical retorts, on the other hand, had a heating surface of 100·6 square feet per ton (English) of coal carbonized per twenty-four hours. Notwithstanding that the heating surface per unit weight of coal gasified was nearly double that in horizontal chambers, the fuel consumption was considerably greater than with the latter. The producers of the chamber settings, moreover, burnt breeze ranging from 0 to 1½ inches in size, which was of comparatively little value; whereas coke well-screened by forks was required for the vertical retort settings. At coke-oven works, the coals were valued according to an established distillation test in the laboratory; and the theoretical figures thus ascertained were usually reached in the works' plant, on the efficiency of which they afforded a check. The present gas-works settings were not so perfected that similar results could generally be attained with them. It should be the aim of constructors of gas-settings to ensure that the theoretical valuation figure of the coal should be reached in the valuation figures of the gas, the bye-products, and the fuel consumed. The large chamber settings already constructed by the speaker had fully reached the valuation figures for gas and bye-products. The horizontal chamber settings with regenerative firing now being erected at the Vienna Gas-Works would work with the theoretical quantity of fuel necessary, just as the coke-ovens erected by the speaker already did.

The next speaker was Herr H. Rauch, the Superintendent of the Munich Gas-Works, who presented the communication of which an abstract translation has already been given in the pages of the "JOURNAL" (*ante*, p. 262). At the conclusion of his remarks, the authors of the papers—Herr Peischer, of Innsbruck, and Dr. Geipert, of Berlin—replied to points raised in the discussion.

Herr Peischer said that he could definitely state that the gas made in the carbonizing chambers at the Innsbruck works was not partly flue gas but was pure coal gas. This was proved by its high calorific power. In regard to the fluctuations of the latter, Dr. Roth, of Zürich, had made an examination extending over two days, and had found that the fluctuations in calorific power were no greater than with vertical retorts. Moreover, it had never once been necessary to change from one gasholder to another because of the varying calorific power of the gas. They worked in and out of their large gasholder, and only changed over when the quantity of gas in it rendered a change imperative. The objections raised to the chambers, on the score of the fluctuating calorific power of the gas, were absolutely untenable. In regard to the cost of a retort-house, it was true that the costs of installation of plant per 1000 cubic feet of gas made, as referred to by the author, included the cost of a retort-house in the case of the vertical retorts, but did not include the cost of a house in the case of the large chambers. But if the contractors for vertical retorts said that a retort-house was necessary, while those for chambers guaranteed that a house was superfluous, this comparison seemed to the speaker quite fair. To his mind, it would be absurd to erect a house for the chambers—the work would only be rendered more arduous thereby. He had certainly contemplated putting a light roof over the bench, but he had not yet made up his mind that even this was desirable. Its cost would, however, be, at the outside, about £85, which was negligible in relation to the rest of the outlay. The estimate of the Vertical Retort Company, on which the speaker's calculations as to the cost of an installation of vertical retorts were based, was, moreover, low in comparison with later estimates which had come to his knowledge. In one case in which he was acting as expert adviser to a municipal gas undertaking, the estimate of the Vertical Retort Company corresponded to a capital outlay of £41 6s. per 1000 cubic feet of productive capacity per diem. With such huge differences in the capital outlay, the question of the provision of a retort-house became of no moment. In regard to the absence of scurf in the chambers, Herr Weiss had evidently been speaking under a misapprehension. Ordinarily, the ascension pipe of the chamber was opened for 30 to 35 minutes before charging commenced, in order to burn out the pipe. Any longer time was unnecessary. But nothing was opened on the chamber except the top lid. The air flowed thence direct into the ascension pipe; and it was inconceivable that it should pass down to the bottom of the chamber against the upward passage of the hot gases from the coke in the chamber.

Dr. Geipert said that the partisans of the large chamber settings had failed to give figures for their working with the fulness with which he had given them for vertical retorts. They were for the most part bald figures, without particulars of the experimental conditions which were essential to their proper appreciation. Only Herr Peischer had given details; and what he had given did not appear to the speaker to be favourable to the chambers. A make of 11,052 cubic feet of gas per ton for Saar coal was very moderate, even taking into consideration the calorific value of 613 B.Th.U. gross per cubic foot for the gas. The fuel consumption of 16·5 per cent., or 31·2 lbs. of coke per 1000 cubic feet of gas made, was high. Owing to the unsoundness of the chambers, the working became very troublesome indeed. There was a pressure-gauge to be watched on each ascension pipe, hourly testings of calorific power were necessary for control purposes, and the pressure in the hydraulic main had to be regulated by hand according to the calorific value of the gas. Gasification ceased for an hour daily while the ascension pipe was burnt out; and this operation produced a great smother. This involved the loss of valuable constituents, which might be reckoned at at least 0·5 per cent. of the weight of the coal carbonized. Herr Peischer chose chambers mainly on account of the higher first cost of vertical retorts. The difference for the Innsbruck installation was about £4580, of which about £3330 would be for the retort-house. The increased cost for vertical retorts would therefore have been only about £1250, which would involve an annual charge for interest and redemption of about £75. But the vertical retorts would effect a much greater saving than this in respect of wages alone. Herr Peischer required eleven men for working his chambers. The small works of Oberspree and Weissensee, in Berlin, had installations of four and five beds of vertical retorts, having a productive capacity of 705,000 and 880,000 cubic feet per diem respectively; and they required only one man in each shift, or three men a day. The man charged and discharged the retorts, regulated the air supply to the furnaces, did the necessary cleaning, and all the work of attending on the settings. Once every 72 hours only he had an assistant for clinkering. Herr Peischer might therefore with vertical retorts have saved eight men, or at least £415 per annum. Moreover, he would have saved fuel also, and have had the benefit of a greater make of gas. The ammonia would also have been increased with vertical retorts. The speaker obtained 0·247 lb. of ammonia per 100 lbs. of Saar coal carbonized, as against 0·220 lb. obtained at Innsbruck. Secondly, Herr Peischer seemed to attach special importance to the limitation of work to the day time, though he admitted that, as a result, the calorific power of the gas made ranged from 393 to 640 B.Th.U. per cubic foot. Equalization of the quality of such variable gas could only be secured by having excessively great gasholder accommodation, the cost of which ought not to be ignored. Thirdly, he had spoken of the maintenance charges in respect of the settings; but Herr Weiss had answered this point by stating that the vertical retort settings at Zürich had required no repairs in the course of 1000 days' working. Fourthly, Herr Peischer had said it was an advantage of the chamber that it was free from scurf. Scurf was formed, however, just as much in the chamber as in the vertical retort; but the chamber was open for such a long time at each charging that the scurf was burnt off again each time. The chambers must thereby be considerably cooled.

There was no reason for assuming that the working at Innsbruck was worse than elsewhere, and, consequently, it must be concluded generally that vertical retort settings worked more economically than chamber settings. Herr Bössner had overlooked the fact that the speaker had throughout taken into account in the fuel consumption the quantity of coke used to produce water gas in the vertical retorts. Calculations, to which no exception could be taken, showed that only two-thirds as much fuel was required for the settings of 18 vertical retorts as for chamber settings. It must be remembered that in practice with a normal temperature in the chamber, gas of high calorific power would be produced, and this would be brought to a lower level by the addition of water gas. The calculations of Mr. Körting and the speaker assumed that the hot coke in the vertical retorts would be lowered about 360° Fahr. in temperature through the formation of water gas. The bearing of this on the advantages derived from steaming in vertical retorts had been discussed in detail by the speaker in a paper read the spring of last year ["JOURNAL," Vol. CVI., p. 296]. Herr Bennighof objected to the trials of fuel consumption of the vertical retort-settings with Silesian coal, on the ground that the coke from this coal was not used, but English coke instead. As a matter of fact, the coke employed was the ordinary works' coke, consisting of about 70 per cent. of English and 30 per cent. of Silesian coke. This was used merely as a matter of convenience. It contained 12·4 per cent. of ash; while the coke from Silesian coal contained only 7 per cent. Thus it was not a better, but an inferior, coke which was used in the trials. The same speaker quoted very high figures for the make of gas in the chambers at Frankenthal. But he would probably find it difficult to maintain such results through a whole year, as it was likely that the settings had been worked at too high a temperature. But what object was there in his quoting figures which were not absolute working results? With reference to chambers, inquiry should be made as to how much nitrogen was contained in the gas from them. This information would be instructive in regard to gasification in chambers. Herr Koppers had declared that 6 per cent. of nitrogen was permissible. There might, however, be 50 per cent. and over of nitrogen in chamber gas. With vertical retorts, on the other hand, the nitrogen in the gas never exceeded 1·5 per cent. The view of Herr Koppers, that the gas in vertical retorts formed an insulating layer between the coal and the walls, had so little support that it need not be discussed. Professor Strache's impression, that the vertical chamber setting had not been properly tested, was ill-founded; and the speaker would merely refer him to his paper. In regard to Herr

Rauch's report of a make of 13,420 cubic feet (uncorrected) of gas per ton, the gas having a calorific power of 554 B.Th.U. per cubic foot, the speaker assumed that this result was obtained by twenty-four hours' working at a high temperature. The fuel consumption would therefore be very high, and the durability of the settings would be endangered. It would have been better if Herr Rauch had corrected his makes of gas to standard temperature and pressure, because at present they were in no way comparable with other figures. In regard to the statements that the figures quoted for vertical retorts by the speaker would be surpassed by chamber settings, he would only advise that when this occurred the duty of the chambers should be again checked by an impartial authority, especially in respect of the fuel consumption.

GAS OILS AND OIL GAS.

By Dr. H. Hempel, of Berlin.

(*Continued from p.* 326.)

Experimental Apparatus and Mode of Working.

After various preliminary investigations, an experimental apparatus was devised for the gas-making trials. This is shown in section in figs. 1 and 2. The gasification chamber consisted of an inclined iron tube A, 40 centimetres (16 in.) long, closed gas-tight at the ends by the caps B. The gas exit pipe C passed through the lower lid of the chamber, and a Mannesmann tube E which passed through both lids contained within a porcelain capillary the thermocouple used for measuring the temperature. The oil was introduced through the branch F containing a spiral distributing trough J. The oil was vaporized in this branch, but superheating of the vapours therein was avoided by protecting the branch with an asbestos jacket. The vaporized oil passed into the gasification chamber, which was maintained over a considerable length at a constant temperature by the use of six Pharos burners fed with air at high pressure. The air supply pipe K was fed from an equalizing holder of 600 litres (about 20 cubic feet) capacity supplied from a compressor and giving a pressure of 30 centimetres (12 in.) of water. Gas was supplied to the pipe L through a meter at ordinary pressure. The gasification chamber was covered with an asbestos-lined sheet-iron cover M with a lid N with three flues. The gasification chamber and its cover were supported on an iron stand O with six holes, through which the mouths of the burners projected into the combustion chamber. A sight-hole was provided at each end of the cover, for observing the flames. In order to prevent the flames striking-back in the burners through the radiant heat from the furnace when worked at high temperatures, a wire gauze was inserted in each burner tube, and in addition a circulating water jacket was placed round the tubes. By this means it was found that even when the temperature of the retort reached 1000° C. the flames did not strike-back in the burners. Separate tubes were provided for regulating the air and gas supply to each burner, and there was a collar on each burner for adjusting the secondary air supply. The adjustment of the gas and primary and secondary air supplies could be controlled so that a constant temperature was secured. The middle burners had a lower gas consumption than the end burners. The variation of temperature over a length of 10 inches did not exceed $\pm$ 4° when the temperature was about 780° C. Radiation was restricted by the use of asbestos covers and screens.

Tar was extracted from the gas by means of a column packed as to two-thirds with glass beads and as to one-third with glass wool. This column was followed by a U-tube loosely packed with glass wool. The gas passed from this tube into a bell gas-

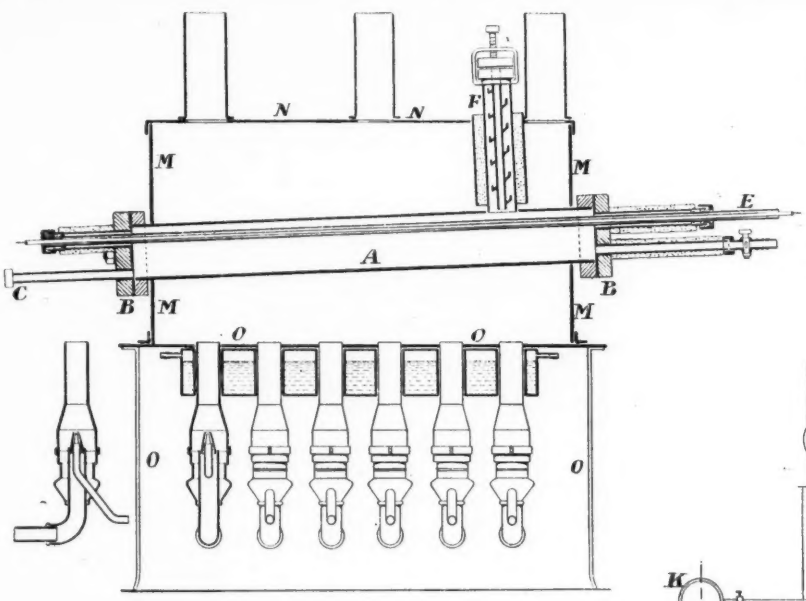


Fig. 1.

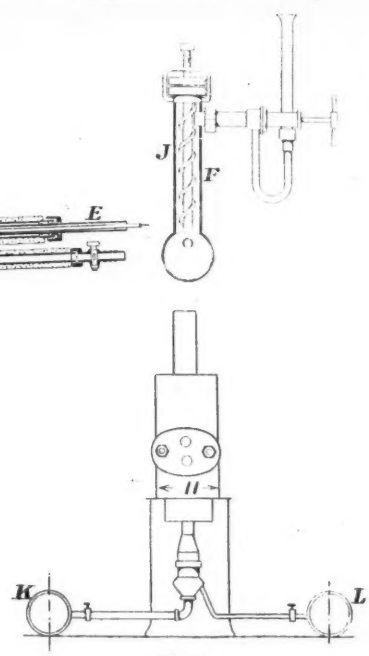


Fig. 2.

holder of 75 litres (2·65 cubic feet) capacity. The tank of the holder was of the annular type, in order to reduce the surface of water exposed to the gas, and thereby the absorption of the constituents of the gas by the water. Analyses showed that the gas remained unchanged in composition for three days. The holder was so constructed that the crown was almost absolutely emptied of gas when the bell fell to its lowest position. The holder was provided with a scale (graduated in litres) and a pressure-gauge, so that the volumes of gas in it could be read off at atmospheric pressure. A small holder with mercury seal was used to collect samples of about 4 litres (0·14 cubic foot) of gas for analyses and determinations of calorific power. The oil supply to the retort was maintained at a constant rate by means of a specially constructed dripping funnel, from which the oil dripped under a constant head into an inclined tube which led into the retort. When a gas-making test was about to be made, the furnace was raised to about the desired temperature, the necessary gas consumption for the attainment of which was known approximately from previous trials. The temperature became constant in about one hour. The temperatures were measured by means of a Le Chatelier thermo-element. The temperature at the oil-inlet end of the furnace was about 15° C. above that of the other end before the oil was run in; but as soon as the gasification of the oil was started, the temperature throughout the retort became uniform. The amounts of oil gasified and of tar extracted were ascertained by weighing. The oil was gasified at the rate of about 1·6 to 2 grammes per minute. The coke remaining in the retort was determined after the latter had cooled. The sample of gas for analysis and determination of calorific power was collected after the gas had stood for three hours in the large gasholder. The illuminating power of the gas produced was ascertained, after it had stood for three hours, by consumption in a fishtail oil-gas burner at the rate of 35 litres (1·236 cubic feet) per hour. The specific gravity of the gas was ascertained by the Graham-Bunsen effusion method. The gas analyses were made in a Bunte burette with the precautions adopted by Haber. The olefines were determined by absorption with bromine, and the hydrogen by combustion over platinum sponge. The paraffins—methane and ethane—were determined by means of the amount of oxygen consumed. The total oxygen consumption of the hydrocarbons was also ascertained, in order to determine whether the hydrocarbons estimated by absorption with bromine contained benzene or homologues of ethylene in addition to ethylene. The gas was usually found to contain 0·6 per cent. to 0·8 per cent. of oxygen, which was doubtless derived from the air enclosed between the retort and the holder. The calorific value of the gas was determined by means of an apparatus devised by Stöcker and Rothenbach (see "Journal" for April 14, 1908, p. 94), with which determinations can be made on as small a volume as 1 litre of gas with an error of only $\pm$ 0·5 per cent. The apparatus was modified by the author, and comparative tests with a Junkers calorimeter showed close agreement in the results.

Gas-Making Tests of Various Oils.

The author investigated, in the way described, the results of the gasification of four oils obtained by the distillation of shale or

TABLE I.—*Gasifications of Various Oils in Identical Conditions. Temperature, 743° C. (1369° Fahr.).*
(All the volumes of gas have been corrected to English standard conditions—viz., 60° Fahr., 30 inches, and saturated.)

Description of Oil.	Specific Gravity of Oil.	Percentage by Volume of Oil Distilling, Below 200°C.	200°C. 300°C.	300°C. 400°C.	Gross Calorific Power of Oil. B.Th.U. per Lb.	Gas Obtained per Gallon of Oil. Cubic Feet.	Illuminating Power of Gas. Candles per Cubic Foot.	Candles per Gallon of Oil.	Gross Calorific Power of Gas. B.Th.U. per Cubic Foot.	Calorific Valuation Number. B.Th.U. in Gas per Lb. of Oil.	Chief Constituents of Gas. Vols. Per Cent. Unsaturated Hydrocarbons.	Paraffins.	Hydrogen.	Specific Gravity of Moist Gas (Moist Air = 1·000).	Tar Obtained. Per Cent. by Weight of Oil.	Coke Obtained, Per Cent. by Weight of Oil.
Messel's shale gas oil, 1908	0·856	—	41·5	51·1	19,339	78·7	9·8	769	1297	11,929	36·61	47·26	13·27	—	27·12	1·90
Riebeck's lignite gas oil	0·873	2·4	68·2	24·0	18,866	72·1	8·0	578	1195	9868	30·42	50·75	15·59	0·725	44·50	2·83
Pechelbronner petroleum gas oil	0·847	—	56·0	41·7	19,588	81·1	9·7	784	1270	12,150	35·40	49·51	13·68	—	36·35	5·02
Galician gas oil A	0·877	2·1	19·6	70·4	19,418	80·6	10·6	854	1307	11,999	34·78	48·61	15·00	0·804	40·39	1·35
Galician gas oil B	0·870	5·5	30·2	58·8	19,334	79·7	9·7	771	1261	11,555	34·14	49·79	14·71	0·780	41·83	2·12
Roumanian gas oil A	0·879	—	80·0	14·2	19,301	73·8	9·0	665	1208	10,145	29·16	50·97	17·14	0·748	49·09	1·70
Roumanian gas oil B	0·886	1·1	67·6	21·1	19,172	71·1	8·9	632	1229	9853	30·24	51·14	16·55	0·747	48·87	1·74

lignite, five petroleums of German origin, and two Galician and two Roumanian oils, and one Borneo residue. In the first-named instance, all these oils, except the last-named, were gasified at the temperature of 743° C., and at approximately the same rate of flow and the same conditions generally. The principal figures obtained are shown in Table I., which is extracted from the more detailed tables given by the author. [The results for several of the oils of German origin have been omitted as of no practical interest to English gas men.]

It will be seen that the fluctuations in the yield of gas with the different oils were about ± 12 per cent., while the tar produced ranged from 27 to 49 per cent. of the weight of oil gasified. The poorer gas-making oils yielded most tar; but on the other hand the maximum make of gas was not necessarily associated with the minimum yield of tar. Oils of similar origin yielded approximately the same quantity of tar, even though the make of gas varied. The oils which yielded the most gas were, generally speaking, those which gave gas of the highest illuminating power and calorific value. The author considers that the results obtained with his apparatus at 750° to 800° C. conform pretty closely with the results obtained in the gasification of oil in retorts on the large scale. He quotes analyses by Scheithauer and Gräfe of oil gas made in technical apparatus, to show that the composition of the gas obtained in his experimental apparatus agrees closely with that of oil gas as made on a manufacturing scale. The gas contained only a moderate proportion (13 to 16 per cent.) of elementary hydrogen; the calorific power depended on the proportion of olefines and methane. The homologues of methane calculated as ethane amounted to 6 to 9 per cent. The fact that the oxygen consumption of the olefines and paraffins was constant in all the samples of gas shows that these hydrocarbons had the same composition in all the samples. Aromatic hydrocarbons did not occur in the gases. If the calorific valuation number is compared with Hirzel's valuation figure, it will be found that the latter has no claim to even approximate exactness. Helfer's valuation figure, on the other hand, is relatively useful, but does not attain the exactness of the calorific valuation number.

The author next proceeded to study the effect of change in the conditions of gasification, and especially of change of temperature, on the gas produced. In a preliminary series of experiments on Messel gas-oil, he varied the rate of flow of the oil as well as the temperature, and came to the conclusion that a fluctuation in the rate of flow amounting to 25 per cent. had practically no effect on the results. On the other hand, change of temperature appeared to have a very great effect. Between the temperatures 711° and 832° C., the yield of gas increased with the temperature, while the illuminating power and calorific value decreased. The calorific valuation number, however, was very little affected for the range of temperature 711-789° C. The illuminating power and the proportion of heavy hydrocarbons in the gas decreased very greatly as the temperature rose, and consequently Helfer's valuation figure varied very much for the same oil between the temperatures named. The total amount of olefines produced from the oil fell as the temperature rose, while the amounts of paraffins and hydrogen increased. The increase, however, could not be wholly due to the decomposition of the olefines, but the methane must be partially at least produced by direct splitting-off of methane from the terminal members of the hydrocarbons of the oil. If the methane were produced entirely by the decomposition of ethylene, the calorific valuation number would decrease, which was not found to be the case. Whereas the calorific valuation number was but little affected by the rise in the temperature of gasification from 711° to 789°, a further rise to 832° C. caused it to diminish considerably. The secondary decompositions then began to occur to a large extent, and hydrogen resulted from the decomposition of ethylene.

The next series of experiments related to the effect of change of temperature on the gasification of Messel gas-oil, while the other conditions of gasification remained unchanged. The oil was gasified at 744°, 785°, and 880° C. The change from 744° to 785° had no great effect on the calorific valuation number, but the latter fell very greatly when the gasification was carried out at 880° C., showing that the best conditions of gasification had been passed. The composition of the hydrocarbons in the gas made was shown to be altered by the rise to the higher temperature. The oxygen consumption of the paraffins fell to that which practically corresponded to methane, while the oxygen consumption of the olefines increased, indicating that benzol or homologues of ethylene had been formed.

Another series of experiments with various gas-oils showed the same effects of temperature as the experiment on Messel gas-oil just referred to. In these investigations, extremely high temperatures were avoided—a difference of about 40° C. only being made between the lower temperature of about 743° C. and the higher temperature of gasification. All the oils examined had been gasified at the lower temperature, with the results shown in Table I.; and it was found they had the same values relatively to one another when gasified at the higher temperature. The splitting-off of terminal members of the hydrocarbons of the oil increased at the higher temperature. The decomposition of the oil was affected quantitatively, rather than qualitatively, by the change of temperature of gasification. The proportion of hydrogen in the gas increased as the result of secondary decompositions, and at the same time the yield of coke was increased. There was no definable change in the amount of tar produced. For the sake of comparison, a residuum or liquid fuel produced from Borneo petroleum was gasified at the higher temperature of 785° C. The yield of gas from it—viz., 8·68 cubic feet per lb. of oil—and the gross calorific power of the gas—viz., 1026 B.Th.U. per cubic foot—showed that the Borneo residuum was less valuable than the other gas-oils examined. The proportion of methane and its homologues in the gas from the Borneo oil was higher, and the proportion of olefines lower, than in the gas from the other oils. The total amount of hydrogen and methane produced, however, from a gallon of the Borneo residue was practically the same as the total amount of these gases from the other gas-oils; but the total amount of olefines was considerably less. It thus appeared that with all oils the production of methane and the secondary decompositions were practically the same, and that the difference between the oils was due to these of lower value being less capable of splitting-off chains of two members and upwards. The specific gravity of the gas from the Borneo oil was naturally lower than that made at the same temperature from the other oils, while the mean molecular weight of the hydrocarbons was higher—indicating the presence in them of the higher hydrocarbons (benzol) in addition to ethylene.

(*To be continued.*)

The Largest Spiral-Guided Gasholder.—The Oldham Corporation have decided to erect at their Hollinwood station a four-lift spiral-guided gasholder of 5 million cubic feet capacity, and have placed the order for it with Messrs. Robert Dempster and Sons, Limited, of Elland. The outer lift will be 210 feet diameter, and each lift 40 feet deep; and the holder will be erected in a concrete tank, 212 feet diameter and 40 feet deep, the order for which has been placed with Messrs. J. Partington and Co., of Middleton Junction. The cutting of the first sod for the tank took place yesterday (Monday).

Purifying Gas and Recovering Ammonia.—A patent has been taken out for the United States by Mr. F. J. Falding, of New York, for a process for purifying gas and recovering ammonia, &c., therefrom, and utilizing the bye-product metallic salts and ammoniacal liquor. According to an abstract of the specification in the "Journal of the Society of Chemical Industry," the gas is first subjected to a preliminary scrubbing with a wash liquor containing ferrous hydroxide, produced in a subsequent stage of the process, in order to free it from sulphur, cyanogen, and chlorine, and is then scrubbed with a solution of an iron salt—for example, iron pickling liquor—whereby a solution containing an ammonium salt and ferrous hydroxide is produced. This solution is treated with an oxidizing agent in order to convert the ferrous into ferric hydroxide, which is removed by filtration. The ammonium salt (ammonium sulphate) is recovered from the filtrate. Gas liquor is treated with a quantity of iron pickling liquor to precipitate its sulphides in the form of iron sulphide and sulphur, and after removal of the precipitate is treated with a further quantity of the pickling liquor, so as to produce a solution containing an ammonium salt and ferrous hydroxide, which is treated as described.

THE CHECKING OF WORKING COSTS IN SMALL GAS-WORKS.

By James Dickson, of Forfar.

[A Paper read before the North British Association, July 28.]

In bringing this subject before you, the writer is aware of the impossibility of obtaining such complete details of working results in small works as are obtainable in connection with the costs of larger works; and he, therefore, wishes to confine himself mostly to what has come under his own observation.

In the smallest of works cost-keeping of a complex nature would be adding considerably to the already limited time of the manager; and as much of the work is often going on under his eye, very good results are in many cases obtained without keeping details of costs. Much depends upon the individual.

The plea, however, is put forward that it is better for one to know than to expect that things will turn out well at the end of a financial year. There can be no insurmountable difficulty, once a works comes up to the capacity of (say) 15 millions, to the keeping of fairly wide working details from day to day. A system once adopted becomes simple, and may mean only half-an-hour per day checking results, and making endeavours to improve to-morrow's, or those of the following week. The recent "Census of Production" schedule, which was issued to all gas-works, would have been filled up at random unless the statistics required had been regularly recorded and available at short notice.

It has been said that many works make profits by chance. This might have been true at one time; but now the tendency is all for progress, in whatever direction it may be necessary to go in order to cheapen the cost of production and place within the reach of the public a gas supply that will compete in any of its manifold uses with all its rivals.

With a high selling price for gas, many little things that could effect a saving may have been for a time allowed to lie over; but with the price being steadily reduced, the margin between income and expenditure is gradually becoming less. The stress of competition in the larger towns has brought down the price of the commodity we sell; and smaller works adjoining them have almost inevitably had to follow suit. Most certainly the changed or changing conditions of gas supply have aided manufacturing costs; but very soon large reductions in the price of gas will no longer be possible. The price of coal is not likely to again touch the contract prices of last year; and as this item always figures as the most prominent in the revenue account of every gas undertaking, the need arises for the smaller concerns being alive to the fact that the greatest attention will require to be paid to the costs of production.

In connection with the question of cost of production, one has always to consider what the commodity is already costing before it is made; and in the case of gas-works, as in every other business concern, it is apparent that the proportion of capital charges in relation to the output must, in large measure, govern the selling price.

It is not possible to fix upon any figure as a standard for capital expenditure per 1000 cubic feet made, as this varies so much in different localities and circumstances; but the writer was induced to give the matter attention so far as it applied to Scotland. "The Statistical Report of the Gas Supply of Scotland," published annually by the Committee of the North British Association of Gas Managers in July, 1909, shows that out of 236 undertakings 151 sent particulars as to capital—*i.e.*, in the case of companies share capital or money borrowed on debenture upon which dividend and interest are payable, and in the case of corporations the outstanding loan debt upon which interest and sinking fund

	Companies.					Corporations.				
Size of Works—Millions.	No. of Works.	Total Capital.	Total Gas Made.	Capital per Million.	Fixed Charges per 1000 Cubic Feet Made.	No. of Works.	Total Capital.	Total Gas Made.	Capital per Million.	Fixed Charges per 1000 Cubic Feet Made.
					10 p. c. Basis.					6 p. c. Basis.
Under 10	58	£145,919	269,125,080	£542	13·01d.	5	£8,295	29,258,000	£967	13·92d.
Under 20 and over 10	26	165,102	345,057,100	478	11·48d.	2	38,427	32,973,000	1166	16·78d.
Under 30 and over 20	10	128,275	260,799,090	492	11·80d.	4	88,209	102,079,000	864	12·44d.
Under 50 and over 30	7	108,932	262,095,000	416	9·97d.	7	167,748	267,026,000	628	9·04d.
Under 100 and over 50	6	199,500	417,145,000	478	11·48d.	10	440,716	733,146,700	601	8·65d.
Over 100	4	298,678	568,508,000	525	12·61d.	12	6,046,476	11,629,858,000	519	7·49d.

are payable. Analyses of these are appended showing the capital per million cubic feet made.

I have put down the standing charges on the foregoing capital debts in the case of companies on a 10 per cent., and in the case of corporations on a 6 per cent., basis; and if the number of undertakings sending in returns fairly represents the whole, and the above percentage returns on the capital are also average ones, the figures show the advantage in this respect to be in favour of corporation undertakings of over 20 millions, and on the side of works owned by companies under this output.

The capital expenditure on works erected within recent years has shown a tendency to come down through the adoption of columnless holders, a general tendency towards simplification of plant, the adoption of steel mains in long lengths, and the disinclination on the part of some to put in too large pipes—persuaded as they are of the advent of high-pressure gas. In addition to this, the equalization of working which now exists in gas-works to a much greater extent throughout the year, has resulted in the accepted practice of former years with regard to storage capacity now being inapplicable. A works in Fife, built within the past few years, capable of making 25 millions per annum, and presently producing 17½ millions, was put down for £7750—equal to £310 per million. Main and service pipes, by the time the above output has been reached, will have cost nearly £4000, or £160 per million, and meters approximately £2500, equal to £100 per million—a total of £570 per million—a figure which compares favourably with some of the older-established works. In the case of the last-named, it will be found that many of the small works have very low fixed charges, brought about by a liberal writing-down of capital and wise extensions out of reserve funds on the part of those who have administered the concern in the past. The writer has charge of an undertaking where the outstanding loan debt amounts to £15,187, and the annual make of gas is 42 millions—working out at the low figure of £361 per million cubic feet made.

These examples bear testimony to the fact that, in keeping down the capital account, the ultimate gain is the consumer's; and the judicious expenditure of capital during the early life of a gas undertaking will go a long way towards the realization of successful working results in after years. For, while one hopes that manufacturing costs are to still decrease, it would seem that more and more money will require to be spent in the outside department as time goes on.

If it be found that in gas-works varying in size from 30 millions down to 10 millions and under, it needs from 1s. to 1s. 5d. per 1000 cubic feet made to provide for interest and depreciation on the plant, it is apparent that the greatest attention requires to be paid to the cost of manufacture; for little opportunity occurs in the course of a working year to remedy any great deviation from the straight line of rigid economy. Unfortunate results can be easier rectified in the larger works than in the small ones. In the latter, they often spell disaster. All of this naturally brings one to the matter of booking working results; for whether the standard charges be high or not, it is the aim of everyone to get the best possible returns out of the plant at his disposal.

Coals.

As this item occupies the most prominent position on the expenditure side of the balance-sheet, it ought on this account to receive first attention. The geographical position of the works will, to a large extent, always determine the price; the remainder rests with the individual and the special circumstances in which he may be placed. Generally speaking, gas-works in the vicinity of the coal-fields find the most suitable coal at their door—also the most economical; while others at considerable distances therefrom will use a good coking coal giving a larger yield of gas per ton, as in most cases the selling price of the gas in the last-named is such that the best return is obtained from this. In the other instance, it will pay to get a smaller yield of gas at a much less price per ton of coal.

Appended are the net costs of coal for two works—one situated in the centre of the coal-fields, and making 17½ millions, and the other 60 miles distant from the nearest pit, and making 42 millions.

(A) Works near Coal-Field.		
Gross cost of coal per 1000 cubic feet made		10·68d.
Less coke sales	4·1cd.	
Tar and liquor sales	2·28	
		6·38
Net cost of coal per 1000 cubic feet made		4·30d.
(B) Works Sixty Miles Distant.		
Gross cost of coal per 1000 cubic feet made		17·61d.
Less coke sales	6·55d.	
Tar and liquor sales	3·02	
		9 57
		8·04d.

"A" works produced per ton of coal carbonized 9647 cubic feet, and sold 6·25 cwt. of coke and 40 gallons of tar and liquor, &c., per ton of coal. The illuminating power of the gas supplied was 17 candles. "B" works produced per ton of coal carbonized 9918 cubic feet, and sold 11·44 cwt. of coke and 51·39 gallons of tar

and liquor per ton of coal. The illuminating power of the gas supplied was 20 candles.

A glance at these figures shows that the works in the coal-field had a good gas-producing coal lying at hand, while the other had to go further afield for a slightly better quality. This, however, increased the gross cost of the coal by almost 7d. per 1000 cubic feet made. The returns for coke and tar of the larger works show a gain of 3·19d.—not nearly sufficient to overcome the initial disadvantage under which it was placed. This difference would have been greater if the local circumstances of both works had been the same, as the comparatively low sale of coke per ton of coal carbonized in the smaller works is due largely (but not altogether) to the fact that there was only work in mid-winter for one setting of six and one setting of four retorts, and in mid-summer for one of four and one of three, as against fully employed settings of six in the larger works.

It is submitted that a monthly stocktaking of coal, coke, tar, and liquor, or sulphate is necessary in order to arrive at a just estimate of the behaviour of different coals throughout the working year; and the writer has found such particulars very useful to him in his duties. The sheet he uses states the various classes of coal delivered during the month; and the results from these are duly noted, and can be referred to at any time. The net cost of the coal is worked out in a manner somewhat similar to the foregoing, with the carriage paid on coke deducted from the receipts, and statistics of gas manufactured, produced per ton of coal, per stoker, average number of retorts in use, gas made per retort charged, gas made per mouthpiece per twenty-four hours, yield of tar and liquor, yield of coke per ton of coal, and percentage of cannel used attached; and the whole is compared with the corresponding figures of the previous year. In this way, results are kept up to "concert pitch."

Purification.

Purification costs are now in small works reduced to a figure comparable with the best obtainable, and need not be considered in this paper, except perhaps to advance the opinion that works purifying with oxide that is nearly spent are probably purchasing their low costs for material at the expense of increased labour bestowed upon its revivification and frequent cleaning of the purifiers; and here the actual cost can only be determined by subdivision of the wages-sheet. The method of revivification by blowing air through the mass after it has been removed from the purifiers, will reduce the costs of preparation considerably; and the total cost of purification, including labour, should not exceed, even in the smallest of works, provided with ample purifying area, ¼d. per 1000 cubic feet of gas made.

Wages.

Next to coals this usually forms the largest item in the balance-sheet of gas undertakings; and once more let me add that there is even more need for watching this item in small works than in large, as one man's wages very often affect the results to an altogether unlooked-for extent. The subdivision of wages to the proper heads is desirable, so that it may be found how and where shortcomings occur. In the smaller works—say, below 20 millions—the two chief component parts of the wages bill are those appertaining to stokers, and, if the district is a growing one, gas-fitters. In works above this size, yardmen, service-layers, &c., will be additional.

With regard to carbonizing (which includes all handling of coal and coke), the site of the works will play an important part in the economical working of the concern. A small gas-works, with a siding into it at a good height above the level of the coal-store, will be able to empty its coals as cheaply as any gas-works with machinery. Nuts can be emptied at the outside for 1½d. per ton, and large coal at 1¾d. While, if the siding should be on the same level as the coal-store floor, the costs are likely to be increased in both cases by ½d. per ton.

The more favourable of these compares well with the best results obtained by machinery; and the only way in which the figure might be improved would be by tipping the waggon on end (which is merely an extension of the law of gravity applied to the high-level railway and the lower-placed coal-store) or by the use of hopper-bottomed waggons. In both cases, however, the end of the shoot going from between the rails would be in a relatively lower position than the one used in hand emptying; and the method would have its limitations if the coal storage capacity was limited.

For filling into barrows once the coal has been placed in the shed, the simplest and speediest method which it has been the author's pleasure to see is one whereby the barrow was run under arches built on the coal-shed floor which abutted on a retort-house, and was filled in about twenty seconds by means of a shoot.

If a low-level siding is placed on the other side of the works for the despatch of the bye-products, no better form of site could be thought of; and coke can be forked from the railway bank at an average price of 3½d. to 4d. per ton.

Against these figures has to be placed the experience of many managers of small gas-works, who require to pay cartage on coal from the station to the works of from 6d. to 1s. per ton, and on coke to the station of from 9d. to 1s. 6d. per ton. If the circumstances for so doing are anything like favourable, it will always pay in these cases to put in at least one siding. The writer was in the position of having a branch line passing his works, and laid 175 yards of siding from this at a cost of £165. Interest and depreciation on this sum, at 10 per cent., amounted to £16 10s.; and now coal can be emptied for nine months of the year by the stokers, and the emptying contracted for during the months of December, January, and February, whereas under the former conditions it would have been costing to-day £45 per annum for carting coal into the works from the nearest siding.

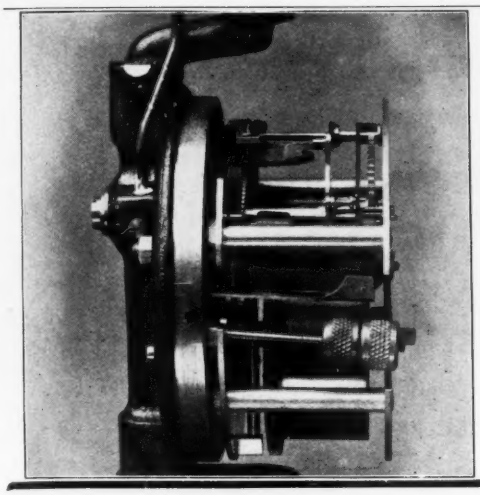
Coming to the actual carbonization of coal, it must be said that the yield of gas per man in small works will never compare well with that attained by machinery where the stoker handles from 6 to 7 tons of coal per eight-hour shift, and makes from 50,000 to 60,000 cubic feet of gas. However, it occurred to me last autumn that better results might be got out of horizontal stop-ends than had been got; and after reading the various articles published at that time on heavy charges, I decided to adopt these in a modified form by using a smaller rake. I managed very well to get through the greater part of the winter with six-hour charges in place of the four-hour charges of the previous winter. Towards the week-ends, in the heavy part of the season, we had to go on 4 hrs. 48 min. duration of charge on account of the necessity arising for making gas quickly, in order to keep the holder on the lift for the purpose of actuating a street-lighting arrangement—an obstacle which, I may say in passing, has been surmounted by the installation of a compressor. But beyond this, we experienced no difficulty whatever. I found in working these heavy charges that one man could carbonize, approximately, 2¾ tons of nuts, handle the residual coke, and make 27,000 cubic feet of gas per eight-hour shift with a fair amount of regularity; and I am of opinion that further experience will show me that this figure can be improved upon. The actual facts are that I was able, with a slightly increased output, to do with one man less. On four-hour charging in the winter previous, there were two men on each shift of twelve hours; and with the longer charging and higher heats, one man on each eight-hour shift took me through the winter comfortably. The make per ton increased over the year by 300 cubic feet working with exactly the same nut, the wages decreased, and the men had a shorter working day.

These results have convinced me that a larger yield of gas per ton can be taken out of horizontal retorts in small gas-works, and a saving effected in wages until such time as the experience gained with vertical retorts is handed down to us from the larger works, and that a wages cost of 2½d. per 1000 cubic feet made, inclusive of handling coal and coke, is one that can be generally looked for under the foregoing circumstances.

With regard to the wages of gas-fitters (which is a growing figure with progressive gas undertakings), I am afraid there is little hope of reducing this by any reduction of the staff, as an attempt at saving here might be no saving. It is needless for me to go into the various details of work done by gas-fitters, as this would occupy much time, and might not apply generally. I should like to mention, however, that I have found the card system very useful for keeping in touch with the progress of outside work. The gas-fitter on leaving for his jobs in the morning is given his particulars on the cards, all of which are handed in at night with a report as to defects found, and whether the work had been completed to the satisfaction of the consumer. If not, the card is put on a separate file and handed out again in the course of a week. A second visit is then paid, and yet another, if necessary, until the matter is effectually dealt with. In the smaller works, one card can serve for meter and stove fixing and complaints, with the respective entries made on both sides of the card according to the nature of the order. In the writer's estimation, when the number of consumers reaches 1500, with perhaps something like 1000 slot meters included in these, the cards form a very useful guide to the manager as to the work done outside, over which he cannot exercise so immediate control as he is able to do inside the works. Consumers are given the best possible attention, as a job is very seldom passed over until he or she is satisfied. The writer was not able to get his gas-fitters' wages much under 3d. per 1000 cubic feet made in a works making nearly 18 millions, or approximately ½d. more than stokers' wages; yet he thinks that it paid him in a rapidly increasing district, where this expenditure was mostly incurred in carrying out extensions, and the whole amount was charged to revenue. A cost book—containing the particulars of costs of main and service-laying (worked out to "per yard"), stoves, grillers, and meters at so much "per appliance," and meters surveyed and watered per day—has also been adopted by him with beneficial results. But he recognizes the limits of the use of this arrangement in the smallest of works, where the other duties of the responsible head of the concern are by no means light.

Rates and Taxes.

It has been my misfortune (if such is the proper designation) to require to make during the past few years fairly large profits; and the rates and taxes upon these have accordingly been somewhat cumbersome—being not lower than 3½d., and as high as 5d., per 1000 cubic feet made. I have no doubt that many other works are placed in the same position. But the matter of valuation for assessment purposes was so ably dealt with by Mr. A. Yuill, of Dundee, in his St. Andrews paper, and has since been taken up in part by the Commercial Sections of your Association, that little of interest can be added by me. Judicious extensions of works and mains, and wise husbanding of capital, will materially help to reduce this imposing item in the balance-sheet; but the manager must also take a practical interest as to how the valuation is arrived at, as the matter is of great concern to him as the individual who is responsible for the results.



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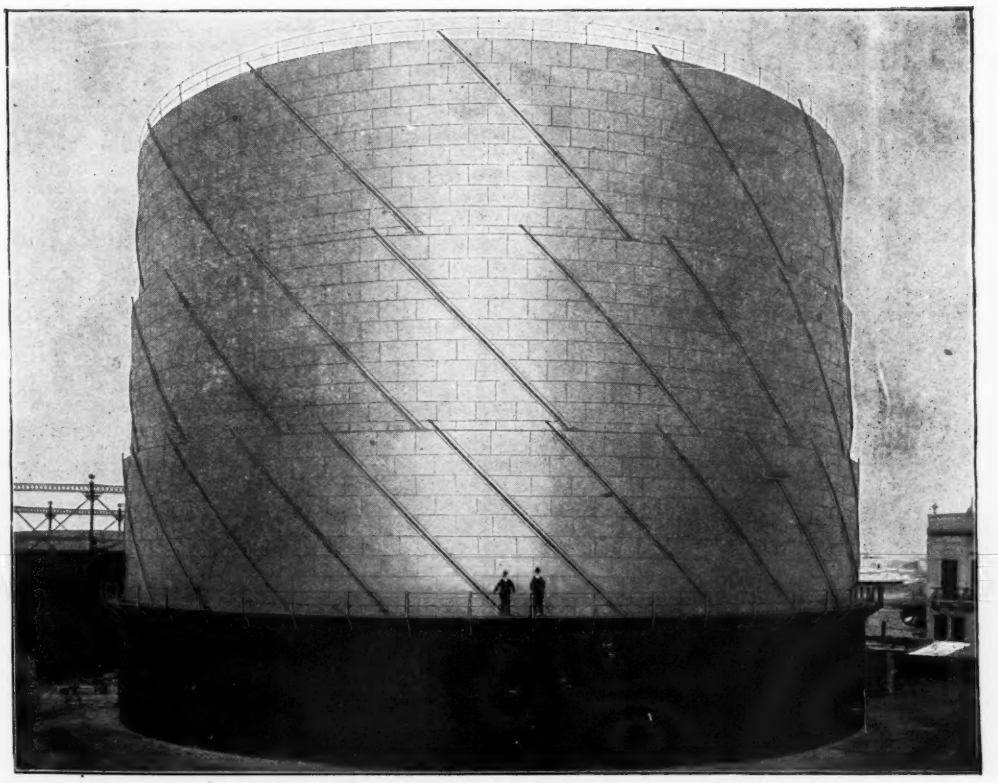

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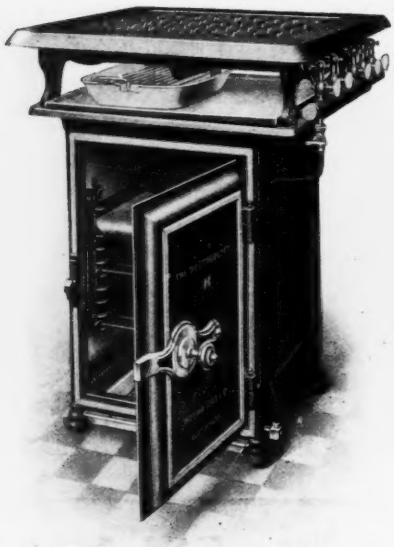

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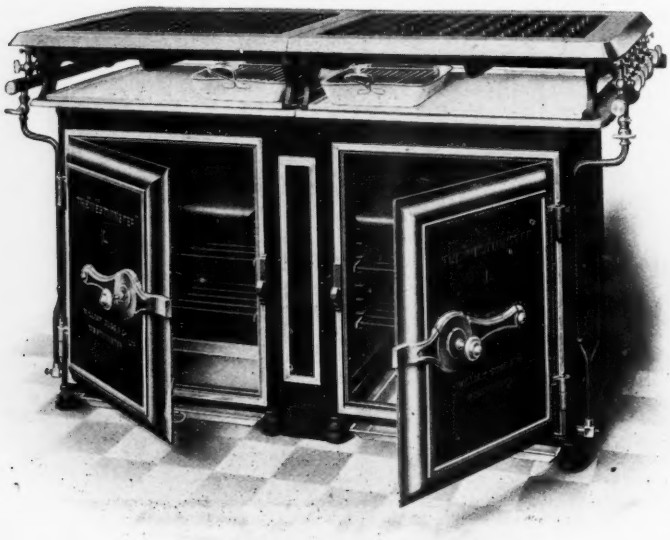

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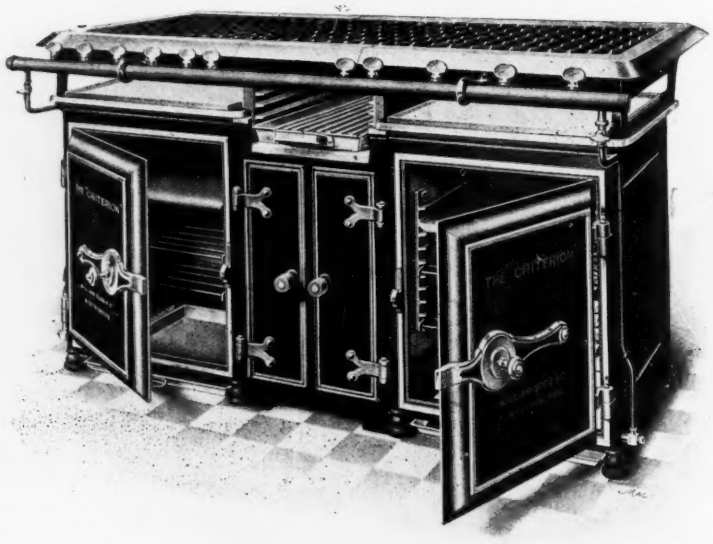

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Repairs to Works.

It is as often as not a sign of strength to see this item in the accounts of small gas undertakings exceed the figure of rates and taxes. It is the desire of everyone to keep the plant in the highest state of efficiency; and many improvements can be effected through this account that bring their reward tenfold.

Repairs to Mains, Services, and Meters.

The remarks upon the foregoing apply in their entirety here.

Stationery and Sundries.

These need not exceed ½d. per 1000 cubic feet of gas made in small works.

Maintenance of Street-Lamps.

Where the street lighting is under direct control from the gas-works, sheets showing the number of mantles issued each day, glasses and reflectors broken, and burners renewed, are necessary if one wishes to know whether this item in the accounts is a profitable one at the price received per lamp per season. No one can question the fact that, from a utilitarian point of view, well-lit streets are a very decided advantage to a gas undertaking in pushing its business; but it is as well to see that the work is undertaken with a reasonable margin of profit.

My experience has not enabled me to get through a lighting season of eight months with less than eleven mantles per lamp; and the expenditure for mantles, glass, lantern panes, reflectors, and all other renewals and breakages has averaged £42 per annum for 120 lamps, or 7s. per lamp. Lamplighting previously cost £32 per season, or 5s. 4d. per lamp; and an increased demand on the part of the contractor who did this work (to the extent of £16) induced the directors of the undertaking to put down an automatic lighting and extinguishing arrangement.

The cost of this was £115 2s. 9d., interest, depreciation, and obsolescence on which came to £17 5s., or an additional yearly charge of 2s. 10d. per lamp. Men's wages attending to renewal of mantles and defective supplies cost £31 1s. 8d., or equal to 5s. 2d. per lamp. There was thus a total maintenance charge of 14s. 10d. per annum, exclusive of gas, which was estimated at 5415 cubic feet per lamp per season. The whole cost worked out as follows:—

5415 cubic feet of gas at 4s. 2d. per 1000	£1	2	6½	per lamp
Men's time attending to defects	0	5	2	,,
Mantles, glass, and other breakages	0	7	0	,,
Interest, depreciation, and obsolescence, at 15 per cent.	0	2	10	,,
Total cost	£1	17	6½	per lamp

The price received per lamp was £1 16s. 6d. In this case, therefore, the gas was being supplied at a rate under that charged the ordinary consumer, which is not uncommon, and perhaps to be recommended, if the reduction is not carried too far.

Standing Charges a Drag upon Small Gas-Works.

The writer wishes, before going further, to dissociate himself from the idea that small works can do as well in most things as large. Better results may be obtained in some process of manufacture; but the size of the output always will influence costs. There is no necessity to labour the point further.

An attempt to draft an imaginary debtor side of the revenue account of a small gas undertaking would be futile, and would serve no useful purpose. So much depends upon the local circumstances—whether the undertaking is statutory or non-statutory, the restriction as to candle power under which it may or may not be placed, the distance it is situated from the coal-fields, and a host of other things that influence costs and the ultimate selling price of the products. The opinion is put forward, however, that many small works under 30 millions capacity in the neighbourhood of the coal-fields are making and distributing gas at from 1s. 9d. to 2s. per 1000 cubic feet made, and from 2s. 2d. to 2s. 6d. per 1000 cubic feet sold, after deducting the returns from residual products. The selling price then depends upon whether or not the fixed charges are excessive. It is apparent, however, that these charges are no inconsiderable drag upon the majority of small works in their attempts to sell cheaper gas. With a price ranging from 3s. to 3s. 6d. per 1000 cubic feet in the neighbourhood of the coal-fields, little can be done by way of pushing gas-fires. In fact, business is more hopeful in this direction with gas undertakings situated a fair distance away, as the price of coal to the consumers there as compared with the householder within easy reach of the coal-field may rise in greater ratio than the price of gas. In every other branch of our business, however, the public will be very well served by small undertakings catering for their needs at the foregoing prices, and offering differential terms to power users.

Reduction of Standing Charges.

The reduction of the standing charges is nearly always best accomplished by extending the demand for the commodity. Situated, as I have been until recently—in a new works, with a capital of £12,000, and an estimated first year's make when I undertook the management of 6 millions—it will be admitted that I have had to give the matter of costs my unremitting study. How far success attended my efforts to reduce the standing charges, may be judged from the fact that the capital is now £13,000, and the make 17½ millions; while the shareholders have been paid the standard dividend of 5 per cent. for each of the three years' working of the concern.

It is perhaps not given to everyone to find within a few miles of his area of supply other rising communities; but where they do exist, they open out a splendid opportunity for adding to the output, at a comparatively low outlay, by means of a high-pressure trunk main. An opportunity like this offered itself to the writer last autumn, when a private company asked a bulk supply for a village of 340 houses, with the almost immediate prospect of this reaching 500, and it was decided forthwith to instal a compressor and lay down a 3-inch high-pressure main at an estimated cost of £1052. The first year's consumption was reckoned at the safe figure of 2½ millions, and the ultimate needs of the district at from 5 to 6 millions. The actual cost was as follows:—

Compressor and steam-engine capable of passing 3000 cubic feet per hour against 2 lbs. pressure per square inch, along with all work preparing foundations and leading-up of steam supply	£146	9	3
4838 yards of 3-inch steel pipe with test-boxes, tobies, and expansion collars	507	6	10
Excavating and jointing	139	14	11
Carriage and cartages	11	12	5
Extras	20	4	8
	£825	8	1

Inclusive of the compressor, the above length of piping figures out of 3s. 5d. per yard; and if 1s. per inch per yard be taken as the basis of calculation for an alternative 6-inch low-pressure main (and the writer has always found it a safe and accurate one), the saving amounted to 2s. 7d. per yard.

Undoubtedly, the question of high-pressure gas transmission appeals to small undertakings, as the increased consumption often means a large percentage increase on the yearly make of gas, and has a very marked effect upon the working costs and standing charges.

In closing this paper, I should just like to add that the working results given therein are not put forward as being in any way out of the ordinary run of everyday practice. Conscious as I am of how much there is still capable of improvement in the field that lies before us, the sole idea that prompted my contribution to your "Transactions" was that, in directing attention to the "two points of decimals," it might prove useful to some in going into the commercial aspect of the business of manufacturing and selling gas.

Discussion.

The President, in inviting discussion, expressed the hope that the managers of small gas-works would come forward.

Mr. D. Vass (Airdrie) considered the paper was an exceedingly valuable one for managers of small works. It was, he said, important that they should have at their fingers' ends something by which they could compare their working of one year with that of another, or week by week, as they went along. When he was first appointed to a gas-works, he was both Manager and Secretary; and he found that there they had been in the habit of drawing up a monthly report. By going into the matter a little more fully than had been done, he developed this into a monthly balance-sheet. He would advise anyone who might take up the subject on the lines Mr. Dickson had shown them, to go into it on this line too, and to work out what were the actual profits for a month. Instead, for instance, of putting in the actual payments for the month, he took the average outlay per 1000 cubic feet, and charged only in each month the proportion of the rates and taxes falling due for that particular month. Almost all the other items coming within the scope of a small undertaking could be charged each month, bringing out the approximate profit for the month. In this way, they kept themselves and their Board in touch with any loss or fault in their results, and so saved themselves much trouble at the end of the year, if their results were shaping downwards. In the paper, and in the one which preceded it, there was a remarkable difference of opinion about the practice of charging against revenue amounts which should be capital charges. He did not agree with this in principle at all. Capital charges should be dealt with as capital charges, throwing the burden on the right shoulders; otherwise they would be taxing the present-day consumers to an extent to which they were not justified. Existing consumers were as much entitled to cheap gas as those in days to come.

Mr. J. Campbell (Bo'ness) thought it was of the utmost importance, in even small gas-works, that they should check their working costs. If these were taken out regularly—say, once a month—any increase in costs which might be discovered could be promptly investigated, and, if possible, remedied, instead of waiting until the end of the year, by which time the figures might have assumed alarming proportions. He made out a monthly statement, showing cost of coal, lime, wages, and benzol, and receipts from coke and tar, worked out to "per 1000 feet made;" and also giving the quantity of coal used, coke and tar sold, &c. These figures he transferred to a yearly statement, showing the costs to date; and by this means, he knew exactly at any time during the year how they stood, compared with previous years. It was quite conclusively shown that a works having a higher make per ton did not necessarily have the lower cost. Mr. Dickson's figures fully bore this out. In his own case, there were coal-pits close to the works; and while they might not get a high yield per ton, still their costs were fairly low. Last year, the gross cost of coal per 1000 cubic feet of gas made was 10·56d. For coke, tar, &c., they received 7·16d.; leaving the net cost of coal equal to 3·4d. per 1000 cubic feet made, and 2s. 9½d. per ton. Regarding the figures of coke sold per ton, a good deal depended,

as Mr. Dickson said, on how they were situated with regard to shipping. He had at times to use a setting with a small number of retorts, which practically consumed all the coke it produced; but notwithstanding this, he sold 8 cwt. of coke per ton. There were some costs that Mr. Dickson might have included—such as watching in the case of main-laying, gas used in works, and leakage. There was a tendency in some gas-works at the present day to use gas rather freely; and therefore it was well to have works meters, as a check on consumption. Leakage was also serious in many cases.

Mr. J. B. Scott (Cowdenbeath) said there could be no question that the checking of costs in small gas-works was a very important matter. He did not know that he could claim having gone so closely into the subject as Mr. Dickson had, though he had given it a great amount of study. It was certainly interesting to be able to check working costs as they went along, and see from time to time how things were turning out. He did not see how they could ever expect to sell gas at 1s. 4d. for fires. Mr. Dickson seemed to prove that gas-works in colliery districts had an advantage from being in the centre of the coalfield. There was no doubt this was the case. The figures at Cowdenbeath were practically the same as Mr. Dickson gave—10·44d., as against 10·68d., for gross cost of coal; and the return from residuals, 6·33d., against 6·38d. But he had not taken cartage into account, which would make them about the same. Mr. Dickson's net cost of coal was 4·30d., as against his 4·11d.; but again the cartage would affect it. While, however, they in the coalfields certainly benefited from being able to buy coal much cheaper—in some instances he had been able to get coal put into the siding carriage free—there were also other things, as had been mentioned. They had the leakage bogey against them; and it was a very serious one. Last winter there was what the miners called a "sit" in a road at Cowdenbeath. In other words, part of the main road suddenly dropped down out of sight, taking a horse attached to a baker's van with it. Their main also went down. In another part of the town, one portion of a building parted from the other, with the result that the gas-pipes were torn from the meter. These things involved very serious costs. He would like to ask Mr. Dickson if 2½d. per 1000 cubic feet for stokers' wages was the average for the whole year, or for only a part when economical making was on. The lowest he had been able to reach was about 3d. per 1000 cubic feet. Of course, he paid very good wages. Mr. Dickson mentioned that he had put in a siding, 175 yards in length, at a cost of £165. He must have been very fortunate, because he (the speaker) knew of another gas-works in Fife, the manager of which approached the railway company to put in a siding, and the company wanted £1000 to be paid before they would break the main line.

Mr. A. Reid (Brechin), alluding to Mr. Dickson's figures as to the cost of coal, said he took those in the lower table to refer to Forfar. Coke was said to yield 6·55d. per 1000 cubic feet of gas made; and the coke sold was 11·44 cwt. per ton of coal. He would like to ask if the figures should not be for coke made, as the coke sold appeared to be out of all proportion. His average was 8·24 cwt. of coke sold. The price in the paper worked out at something like 14s. 5d., while his own came to 15s.; and there was a difference of 7d. per ton in carriage between the two towns. They would agree that 11·44 cwt. of coke sold was a very large proportion.

Mr. R. W. Cowie (Dalkeith) stated that they did not go into the question of costs at all. As a matter of fact, consumers were supposed to buy their own meters, fix them, &c. He generally drew up, for his own satisfaction, a monthly statement of gas made, and coke, tar, and liquor sold—a very simple statement which, put together every three months, formed a quarterly statement which satisfied his Directors. But since going over Mr. Dickson's paper, he could quite well understand that, for his own sake at any rate, it would be advisable to go into the question of costs as fully as possible.

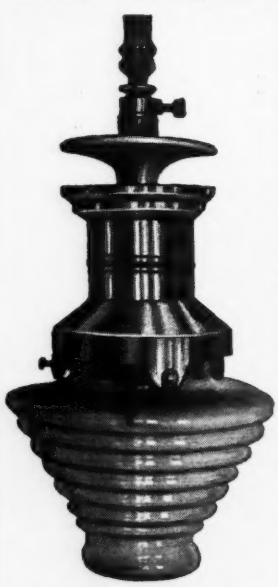
Mr. Alex. Wilson (Glasgow) thought the author was on the right lines; and if it were a new subject with Mr. Dickson, the further he carried it out the better. The taking of costs was absolutely essential if managers were anxious to get the best returns. He supposed the matter was accentuated when they came to large works. In his own case, they not only made up statements every month, but they were tied down now to make them every week. It was necessary to check the smallest amount of leakage at once, if they wanted to maintain their standard. If they were to go on for a month without having a balance-sheet made up, they might find, by the end of that time, that much damage had been done. A month would be too long in a large works; and, if this were so, it was too much in a small works. There was no great difficulty in taking the costs week by week. If Mr. Cowie would only take out his figures week by week, he would find a benefit.

Mr. Dickson, in reply, thanked Mr. Vass for his kind reference to the paper. With regard to capital charges being put down to revenue, in this respect his remarks chiefly referred to the wages of the permanent staff. He hoped he did not convey the impression that he was in favour, generally, of charging as much as ever he could to revenue which ought to be charged to capital. He thought he referred to the matter in the case of gas-fitters; and there, if the work had been contracted for, it would naturally have followed that the expense would have been charged to capital. But, with gas-fitters of their own working, the cost was all taken from revenue. He would like to congratulate Mr. Campbell upon his results. He seemed to have a net cost of 3·14d. for coal, which was very good indeed. Mr. Scott referred to standing charges in small works being as large as what Mr. Napier proposed to sell gas at. This was no doubt true in many cases; but Mr. Napier would propose to sell gas only at that figure when it was required. He would remind them that the further they were away from the coalfield the better the price they obtained for gas for fires. As to the 2½d. per 1000 feet for stokers' wages, the figure they got was 2·8d., including emptying all coal and the filling into waggons of all coke which was going outside the district—everything from coal-waggon to coke-heap. This figure of 2½d., under the foregoing circumstances, was, therefore, one which might be looked for. As to the high yield of coke in one instance, along with such a small return in pence, there were particular circumstances affecting this case. The members would find, on looking over returns of municipal gas accounts, that these results varied very much. In this case, he might mention that the coke was taken away immediately it was stacked—it was taken away wet.

THE "PACO" INVERTED BURNER.

In choosing an inverted gas-burner, users who study their lighting arrangements are not to-day satisfied with only a high illuminating efficiency, but choice is also made of a type that gives promise of easily maintaining the high efficiency, and of presenting permanently a good appearance. Nothing vexes the eye of the gas man more than a lamp of dirty exterior; and what vexes him, will equally annoy other people. In the "Paco" inverted lamp, we have one that combines the features mentioned—high efficiency, easy maintenance of efficiency, and clean exterior—and, beyond, its parts are interchangeable if accident occurs. "Paco" is a title coined from the initial letters of the Company who are putting the lamp on the market—the Patent Appliances Company, of No. 15 and 17, City Road, E.C.

Looking at the lamp with an eye to its practical points, its design proves a complete recognition of requirement. The burner and body or casing are made separate; and, should trouble occur with either the one or the other, it can be independently replaced. Both are made of china, so that there is no possibility of discoloration or tarnishing; and the casing is as readily removed as the globe for washing. The casing being white surfaced, with gilt lines relieving it, it has a graceful appearance, and is suitable for almost any position. Let us take the bunsen tube first. It is of china, with, at the top, the brass fitting comprising the gas-nipple, and gas and air regulators. Forming a junction between this fitting and the bunsen tube is, as the illustration shows, a shield, which serves the dual purpose of a protector of the primary air admission-holes and a deflector of the uprising products of combustion—space being left between the shield and the outer casing for the dispersal of the products. By this deflecting arrangement, the primary air is kept uncontaminated; and the fitting to which the burner is attached is protected from any direct contact with the products. The primary air-holes of the burner are all protected by gauze; and the regulation is by means of a movable collar with a projecting piece for manipulation. The gas-regulator is very sensitive, and is ingenious. Briefly described, it is an arrangement of horizontal cones, which respond to the slightest turn of the regulating screw; and thus ensures a precise adjustment. Part of the way down the bunsen tube, there are three substantial lugs, flat-topped, which form the supports for the outer china casing, on the inside of which are projections formed with side pieces, so that, when seated on the lugs of the bunsen tube, there can be no danger of displacement. At the bottom of the bunsen tube, there is the magnesia nozzle (which is made exchangeable), formed with supports for the mantle. There is no danger of the nozzle dropping from the bunsen tube, as, owing to the thickness of the latter, a deep thread is permissible, and consequently a firm and secure grip is obtained. The outer casing is provided with air-holes just at the top of the expanded portion furnishing the support for the globe. A loose circular metal fitting is supplied for, if desired, supporting an inner glass cylinder. The globe shown in the illustration (Jena glass) has been specially designed, with a view to obtain as complete diffusion of light as possible, with the least deterioration of the candle power. But, of course, the burner will take any other standard size globe suitable for a $3\frac{7}{16}$-inch flange fitting.



The "Paco" China-Burner.

Regarding the efficiency of the burner, the results of tests with

which we have been supplied show that it is notably high, even at the low pressures named:

Gas Pressure. Inches.		Consumption. Cubic Feet.		Candle Power.
1	..	2·45	..	80
14-10ths	..	2·80	..	85
18-10ths	..	2·97	..	110

These are high efficiencies, which we have not proved photometrically. But we can say that a burner which has been in use under observation gives a brilliant light, and all the other claims of the Patent Appliances Company have, during the period of use, been fully confirmed.

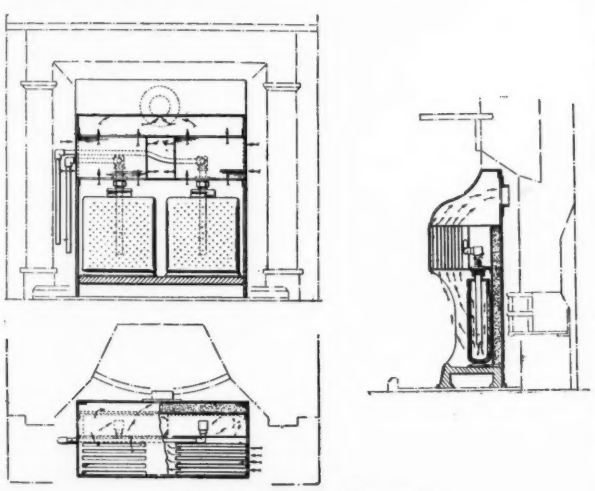
REGISTER OF PATENTS.

Regenerative Gas-Stoves.

SOLON, M. F., of Wilnecote, near Tamworth.

No. 12,606; May 28, 1909.

The special features of this invention are that the gas and air are heated independently prior to mixing, and that the air is admitted to the burner and led to the bunsen jets in such a manner as to traverse a maximum of heating surface in the minimum of space, and, further, that the gas is led in through a chamber heated by the burner, and is thereby heated prior to ignition.



Solon's Regenerative Gas-Stove.

As applied to a standard stove (as shown), the burner body may be in an elongated form with (say) the rear part hollow and packed with silicate cotton or other non-conductor of heat, and the front part made of fire-clay or other suitable material, and perforated. The burner bodies are arranged in a metal casing, which at its upper part contains a series of tubes through which the heat from the stove passes, and over which the air is drawn in entering the casing, or through which the air enters the casing while the heat plays on their exteriors. The gas supply pipe is arranged to pass into the stove through the hot-air casing, and then down into the space behind the perforated front of the body part. The hot-air casing is preferably closed on all sides except where the air enters.

Controlling the Supply of Gas to Burners.

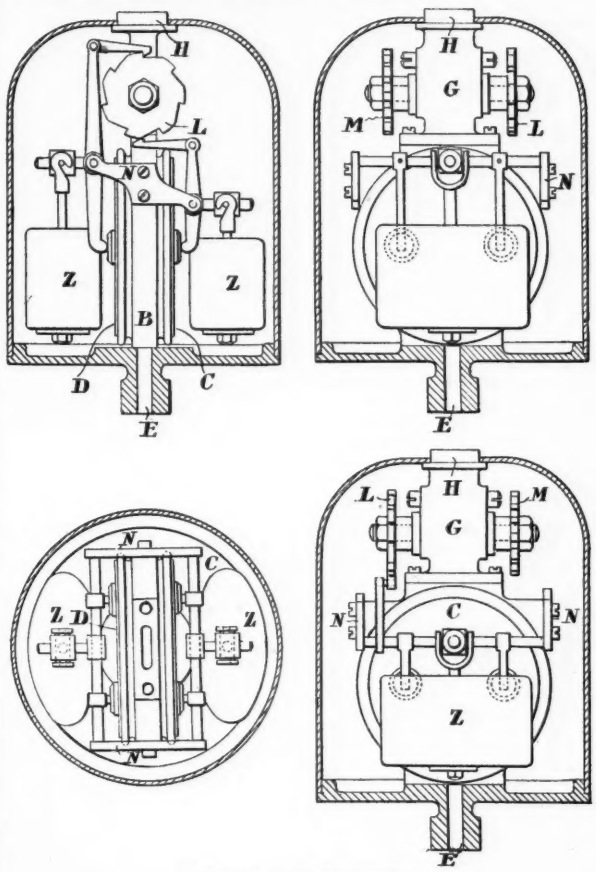
NORTH, R. B., of Soho Square, Westminster.

No. 15,768; July 6, 1909.

This invention relates to automatic apparatus for controlling the supply of gas to burners of the type where the automatic action of turning the gas-valve to raise or lower the lights is dependent upon variations of pressure set up in the system.

A diaphragm chamber—preferably consisting of a flat chamber both sides of which are expansible oppositely or outwardly—is arranged to operate upon two dissimilarly weighted pawl levers or two dissimilar weighted pawl levers; a preliminary or partial collapse of the diaphragm chamber causing one pawl lever to turn a ratchet wheel one step, a complete collapse of the diaphragm chamber causing the other pawl lever to turn the ratchet wheel another step, and the subsequent raising of the pressure resetting the pawls ready for the next reduction of pressure. The variations of pressure may be arranged to succeed one another, and be utilized in the following manner: Upon the gas pressure being raised to the normal, or abnormally, the pawls are reset; upon the pressure being then lowered to normal, or below normal, one of the pawls operates the ratchet wheel to turn on the supply to the burners; and upon then abnormally lowering the pressure, the other pawl operates the ratchet wheel to turn off the gas.

In the illustration, a bell-like casing is arranged (preferably centrally) with a flat circular chamber B the two flat sides of which are constituted by flexible diaphragms C D. The diaphragm chamber communicates with a gas supply connection E in the floor of the casing, and a valve casing G is bolted to the top of the casing with a discharge connection H arranged to just protrude through the top. The plug of the valve which works in the casing G has spindle parts extending from respective ends and conveniently lying in about the plane of the diaphragm chamber. Upon one of such spindle parts, a ratchet wheel L is fixed, and upon the other part is a star wheel M, the points of which have twice the number of teeth upon the ratchet L—convenient numbers being seven upon the ratchet L and fourteen upon the wheel M. The plug in this case must therefore also have seven slots or ports if hollow, or seven cored passages if solid, for registering with the inlet and outlet ports in any one of the seven positions.



North's Gas-Light Controller.

Brackets or arms N are secured on the wall B of the diaphragm chamber, and, extending outwardly beyond the flat faces of this chamber, are adapted to support the pivots or shafts of two three-armed levers. The upwardly and downwardly extending arms in connection with the diaphragm D are of greater length than those in connection with the diaphragm C and the pawl L of the arm which takes over the top of the ratchet wheel, whereas the pawl of the shorter arm takes under the ratchet wheel, and is maintained in engagement therewith by any suitable means, such as a spring, not shown.

Suppose that with the parts in the first position the gas pressure is reduced, the diaphragm chamber will partially collapse, and will permit the weight Z to cause the pawl L to move an appreciable amount and to turn the ratchet wheel to the extent of (say) half-a-tooth, thereby turning the cock in the casing G to turn on the gas. During this movement, the lower pawl merely rubs against the circular portion of the adjacent ratchet tooth, and finally takes behind the more or less radial face of it. The amount of movement of the diaphragm, however, is insufficient to permit the smaller lever to give its pawl any driving movement. Upon further and abnormal reduction of the pressure, the weight Z is permitted to move the smaller lever to an appreciable extent, and the ratchet wheel L is at once turned to the extent of half, or the remainder of, a tooth; and the cock is turned to turn off the gas. When the pressure is again raised to the normal, or to an abnormal degree, the diaphragms C D will be again expanded or distended, and will reset the pawls in the first position shown; the pawl of the longer lever taking behind the tooth next to that which it last engaged, and the pawl of the shorter lever, after having ridden up the inclined portion of the next succeeding tooth, resting at about the commencement of the more or less circular portion of the periphery of such tooth. A click or detent is arranged to engage between the points of the star-wheel M above referred to; and this wheel M having fourteen points, its movement (and therefore the movement of the ratchet wheel L) will be arrested at each step-by-step movement of the latter.

Automatically Operating Gas-Burners.

ROBSON, G., of New Oxford Street, W.C.

No. 14,681; March 27, 1910.

This invention relates to apparatus (controllable from a single station, for automatically operating gas-burners) of the type described in patent No. 20,109 of 1907—*i.e.*, the apparatus wherein two weights are adapted to act upon an expansible casing in such a manner that, upon a certain intentional abnormal increase in pressure occurring in the main, the casing expands to release one or more wheels of a train of clockwork,

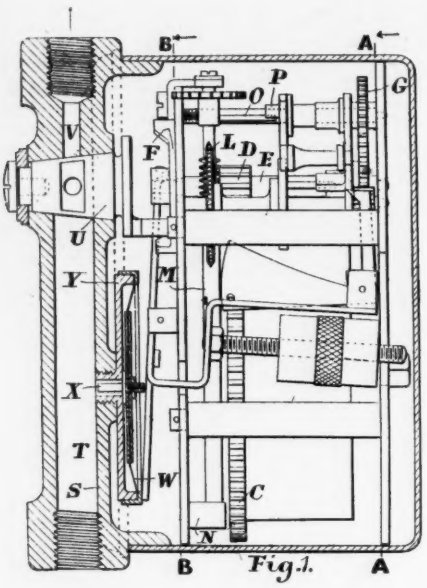


Fig. 1.

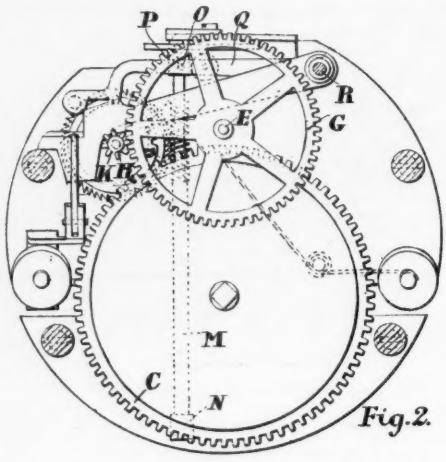


Fig. 2.

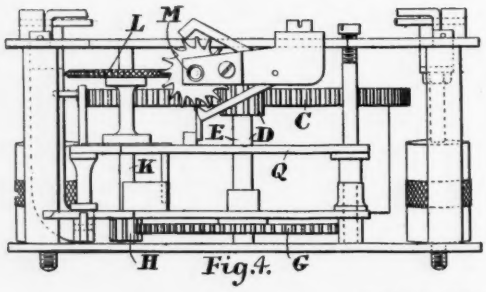


Fig. 4.

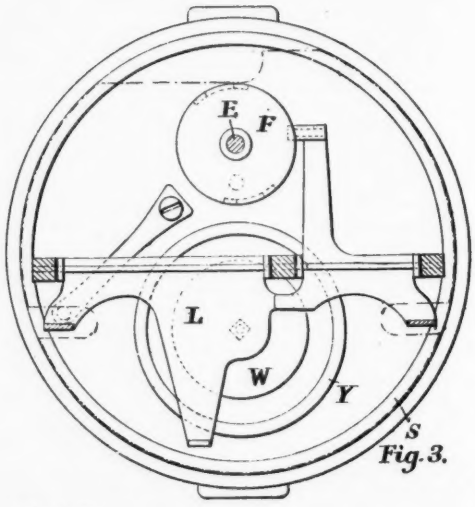


Fig. 3.

Robson's Automatic Lamp Controller.

and then, on a subsequent decrease of pressure, the casing contracts to release a governing wheel and allow the clockwork to actuate the gas-valve. In the apparatus, also, the expansible casing is adapted to be relieved of the effect of one weight under certain conditions, to enable the variation in pressure required to control the operation of the clock-work for extinguishing the light to occur within a lower range of pressures than that required for the lighting operation.

The present invention has particular reference to the arrangement of the two weights and their operation by the diaphragm or other expanding chamber and the mechanism for locking and releasing the clock-work. The object is to so arrange the weights and the locking and releasing mechanism, and to so arrange the means employed for relieving the diaphragm of one weight, as to enable the degree or time of relief to be varied in order that the burner may be lighted or extinguished merely by an abnormal increase of pressure, instead of necessitating an abnormal increase and then a decrease as above referred to. This arrangement is sometimes preferable where the gas plant is normally worked at or about full load, "under which conditions it is difficult to obtain the requisite abnormal increase and decrease after the general lighting for an evening has been commenced."

Fig. 1 is a side elevation of one form of the apparatus. Figs. 2 and 3 are transverse sections on the lines A and B looking in the direction of the arrows. Fig. 4 is a plan of the greater portion of fig. 1.

A removable casing encloses the operating mechanism, which is preferably driven by a spring within a barrel, on which a spur wheel C engages with, and drives, a pinion D upon the shaft E, on the end of which is mounted a disc fitted with two single-stepped cams F. The shaft is also fitted with a spur wheel G, which engages with, and drives, a pinion H on the shaft K, which carries a worm wheel L the teeth of which are in mesh with the threads of a worm in a shaft M. This shaft is approximately vertical. Its lower end rests in a footstep N, while its upper end is fitted with the usual escapement and a pin O adapted to engage at the proper time with a stop P carried upon a horizontal lever Q fulcrummed on the frame at R. The operating mechanism thus far described is preferably carried upon a flanged plate S in any suitable way. The gas supply pipe T is fixed to, or formed integrally with, the plate S, and the gas under the control of the gas-cock U passes away to the burners by the pipe V.

The gas, before it reaches the cock U, is caused to act upon a diaphragm or movable part W of an expansible chamber Y by passing through an opening X, in communication with the interior of the expansible chamber. The diaphragm is adapted under the pressure of gas to move outward to actuate a system of weighted bell-crank levers, and to move inward to follow up a reduction of pressure by means of the weighted lever. The levers (partly in the form of plates) are fitted with adjustable weights, and one of them has one arm or member constantly in engagement with the diaphragm, while the other one has a short arm adapted to engage with a similar arm upon the first lever; so that although the second lever is free normally to press upon the arm of the first one, and therefore upon the diaphragm, it is adapted to be moved away therefrom to lessen the weights on the diaphragm by means of the cam F, which engages with the third arm or lever integral with, or connected to, the second lever.

The disc carrying the cams is mounted upon the spindle E of the clockwork mechanism which is used to actuate the gas-cock, provided with the usual port; and the cam is preferably provided with a pin adapted to directly engage a pin on the end of the gas-cock. The arm of the weighted lever which is constantly in engagement with the expansible chamber carries a pawl formed on one arm of a bell-crank lever fulcrummed in lugs mounted on the first lever for raising the locking lever Q, which releases the clockwork mechanism. This lever (as before described) carries a stop P adapted to be moved into, or out of, the path of the pin O mounted upon the upper end of the worm shaft M controlling the clockwork mechanism.

The cycle of operations is as follows: Assuming that the burners are all extinguished and the normal daytime pressure prevails in the mains, the pressure is raised to an abnormal degree when it is desired to light the lamps. The diaphragm expands against the action of the two weighted levers and raises the pawl to a position a little higher than that indicated in dotted lines, to lift the locking lever Q and release the clockwork, the shaft E of which carries a cam and operates the gas-cock so that it may pass gas to the burners as already described. During this movement, the action of one weight upon the diaphragm is removed by means of the cam F. In order to permit the tooth to drop at the proper time into the notch in the disc to allow the pin O to engage the stop Q, and thereby stop the mechanism, the pawl is removed laterally from the path of the pin by the action of a lever, which is raised just as the notch on the disc is coming round into position; so that the pawl is thrust backward and there will be nothing to prevent the tooth dropping into its notch. When the pawl moves inwardly again, it will come to rest, not beneath the pin, but against the end of it.

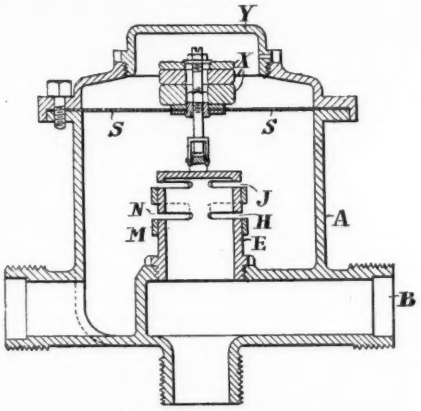
When midnight arrives, the pressure in the mains is reduced as usual. The action of the weight upon the diaphragm causes it to contract and lowers the pawl till it assumes the position shown in dotted lines, or even that in full lines—the lights remaining unaffected. When it is necessary to extinguish the lights, the pressure in the main is again raised to overcome the pressure of the one weight and raise the pawl to release the clockwork and actuate the gas-cock to extinguish the lights—both weights finally returning to duty. It will be understood that the reduction of pressure at midnight may be only just sufficient to bring the pawl under the pin, or it may be any degree lower than this; adjustment of the weights assisting this variation. By this arrangement, the clockwork is positively locked after lighting up is effected, and no movement of the clockwork occurs at the midnight reduction of pressure.

Gas-Governors.

NORTH, R. B., of Soho Square, Westminster.

No. 15,769; July 6, 1909.

These governors are of the type comprising a casing with an inlet and outlet for the gas and a flexible diaphragm mounted in the casing and connected with a valve adapted to close or reduce the aperture for the passage of the gas to the interior of the casing as the pressure of the supply increases. In such apparatus, it has been suggested to form the valve as a cylindrical slide-valve having its upper end closed and formed with ports the length of which was parallel to the axis of the cylinder. This valve was adapted to slide on the exterior of a similarly ported cylindrical extension of the casing which formed the inlet to the governor for the gas pressure. According to the present invention, the valve is constructed in the form of a ring having one or more series of slots or ports which are narrow in the direction of the axis of the ring and which extend for some distance around the periphery of the ring. The ports work in conjunction with a similarly slotted cylindrical portion in the casing. The ring valve has upwardly extending lugs, whereby the valve may be readily connected, through the medium of a rod and bridge-piece, to the diaphragm by means of which the valve is operated.



North's Gas-Governor.

In the central vertical section shown of a gas-governor constructed according to this invention, the pressure of the gas admitted to the casing A through the inlet B passes through the slots H, J, and N and raises the loaded diaphragm S, which lifts the ring valve M and moves the imperforate portions of it over the slots H J; so that the greater the pressure beneath the diaphragm the more the latter is distended, and the less will be the opening for the passage of gas through the governor. Similarly, the lower the pressure the more the diaphragm is collapsed, and the greater the opening for the passage of gas.

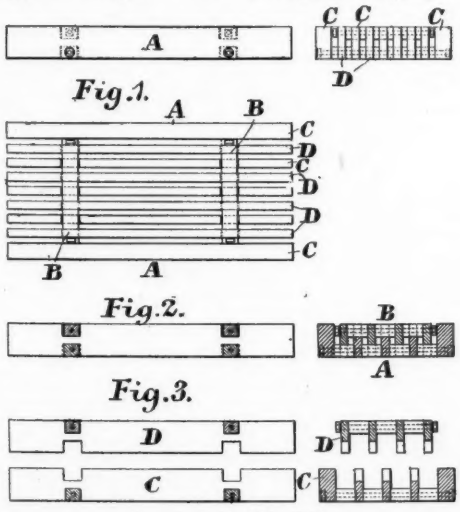
It will thus be seen that, by removing the plug T from the cover, the weights X are readily accessible. By unbolting the cover, the diaphragm S and valve M may be removed to uncover the fixed cylindrical portion E, which can then be adjusted or unscrewed and removed as desired. The cylindrical portion, like the plug in the cover, may be formed with notches in its flange, in order that a key may be engaged with it to unscrew or screw up the part E.

Grids for Gas Purifiers.

CHANDLER, S. & J., of Brixton, S.W.

No. 18,656; Aug. 3, 1909.

According to this invention, the grid is constructed as usual, with the "important exception" that it is composed of upper and lower



Chandler's Purifier Grids.

sections or members, which fit loosely one into the other and form a "compound grid." When it is necessary to clear the choked spaces between the bars, the upper member is removed; so that the spaces of both the lower and upper section are of a width which allows of their being easily cleaned.

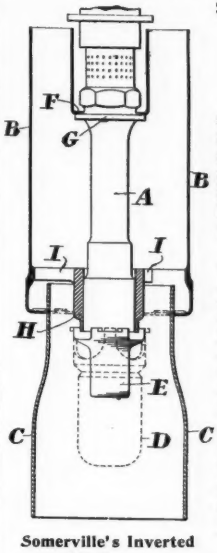
Fig. 1 is a side view, end view, and plan of the grid; fig. 2 has longitudinal and cross sections; and fig. 3 gives views of the two parts of the grid separated.

The member A is composed of a series of bars C united by cross-bars or distance-pieces; while the member B is provided with a series of bars D, also united by cross-pieces. Bolts are passed through the cross-pieces and bars for holding the respective sets together. The bars C are arranged at such distances apart that the bars D fit between them; the two sets of bars together making up the entire surface of the grid. The bars may be notched so as to receive cross-bars; but this is not necessary, as one set of bars may rest on the cross-bars of the other set.

Inverted Incandescent Gas-Lamps.

SOMERVILLE, J. M., of the South Metropolitan Gas Company, Old Kent Road, S.E.

No. 11,258; May 6, 1910.



Somerville's Inverted Gas-Burner.

When inverted gas-lamps have a casing surrounding the bunsen tube and supporting the glass or chimney which encloses the mantle, there is some difficulty, the patentee points out, in maintaining the bunsen tube and its surrounding casing concentric; and his invention has for its object to provide means for securing this.

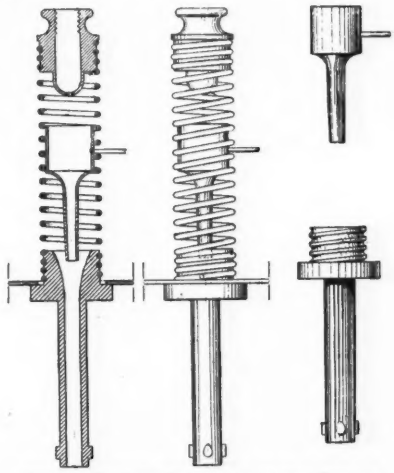
It will be observed from the engraving that the casing B is supported on the bunsen tube A at its upward end. The upper part of the tube passes through a hole in the transverse plate F, and the flange G on the tube (being of larger diameter) catches beneath the plate. "This method of support is a loose one, and by no means ensures that the bunsen tube shall remain central within the casing." According to the present invention, a device H is employed, which is preferably of clay, and has a cylindrical hub adapted to snugly embrace the lower end of the bunsen tube just above the nozzle E. On the hub of the device are radial arms I, of equal length and just sufficiently long to touch the interior of the casing when the device is in the position shown, and so maintain the parts concentric.

Inverted Incandescence Gas-Lamps.

GIORGI, A., of Florence, Italy.

No. 30,002; Dec. 22, 1909.

This invention is designed "to utilize the gas to the utmost extent by intimately mixing it several times with a uniform and regulated quantity of air to keep the fitting cool where the lamp is attached (although the upper part of the burner may be entirely made of a material which is a conductor of heat) and to prevent vibration of the burner itself."



Giorgi's Inverted Incandescent Gas-Burner.

There are interposed between the gas nipple or injector and the burner-tube adjustable funnels, forming air supplies, and serving to regulate the air and to direct the mixed air and gas to the burner-tube. The funnels are supported axially within a spiral spring, one end of which is attached to the gas nipple or injector, while from the other end the burner-tube is suspended. This spiral spring (practically forming part of the bunsen burner) not only serves to support each funnel in the position to which it has been adjusted, but also prevents vibration of the burner-tube and, at the same time, acts as a radiator—the entire burner constitutes an anti-vibration device. Upon the burner-tube (preferably at its upper end) is fixed a disc or deflector, so as to prevent the products of combustion entering the air supplies.

With a burner constructed as described and shown, the gas, on issuing from the gas nipple or injector, mixes with the air and passes into the central funnel; and, passing out of the funnel, it again mixes with the air prior to entering the burner-tube below, "thereby utilizing the gas to its utmost extent and delivering it in a suitable condition to ensure a better combustion." In the construction illustrated, the gas is mixed with air twice; but by employing additional funnels, it may be mixed several times with air.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The Westminster Corporation Street Lighting Contract.

SIR,—On Thursday last, I took advantage of a lull in the rain storm to make a careful test of the illuminating power of one of the Aldwych gas-lamps. The figures are as under.

Standard of Light.

Osram lamp, 8·5 volts 2·1 amp., running off cells; 15-candle power corrected, standardized by the Harcourt pentane lamp, corrected as follows.

Wet bulb	65°
Dry bulb	59°
Barometer	29·75 inches
	9·53 candles.
Power of lamp, 50° angle	3712 candles
,, ,, 20° ,,	4288 ,,

I would point out that, in future, the correction of the pentane lamp will be necessary for any street lamp tests made under stipulations for actual candle power. In ordinary gas testing, the relative conditions of the lamp and the test-burner render the correction superfluous; but in direct competition with electricity for street lighting, gas lighting must always be handicapped by its susceptibility to atmospheric conditions.

Earl Street, Westminster, S.W., Aug. 6, 1910. JNO. F. SIMMANCE.

Points on Gas-Works Transfers.

SIR,—We are a gas company with no Provisional Order or Act of Parliament. Our relations with our local authority are at the present very amicable; but the time may come when it would like to purchase the gas-works, &c.

Now on what lines would the award probably run—so many years' purchase of our profits? If so, large profits are the thing to aim at, and not cheap gas. Or would the value be based on our capital expenditure account? If so, this ought to be increased on every possible occasion. But a large capital expenditure account means more capital on which to pay dividend; and this is not conducive to cheap gas. Or would the valuation be on the sales of gas, irrespective of profit?

To provide cheap gas, it seems necessary to keep the capital expenditure account as low as possible—paying as much as possible out of revenue. But if ultimately this would be the worst policy for the shareholders, what is the best course to take?

DISSATISFIED.

July 30, 1910.

[We give this letter from the Secretary of a Provincial Gas Company, anticipating that readers may possibly like to discuss some, at all events, of the several points on which our correspondent wants enlightenment.—ED. J.G.L.]

Coin Consumers' Agreement—Action as to a Gas-Meter Destroyed by Fire.

SIR,—I have noticed from time to time inquiries addressed to you in respect to the wording of agreements with coin-meter consumers. It has occurred to me that the enclosed case may assist your readers.

JAMES S. GARRARD, Secretary.

Eastbourne Gas Company, Aug. 6, 1910.

[ENCLOSURE.]

Early in the present year, a fire occurred upon the premises of a small shopkeeper at Polegate (one of the villages supplied with gas by this Company). A claim was made upon the consumer for the value of the meter, £2 3s. (the damage being restricted to the meter), and for the gas consumed, £1 13s. less 9s. recovered from the debris. In the end, County Court proceedings were taken. The case, which was undefended, occupied the Court on two occasions, June 2 and July 7. At the first hearing, His Honour (Judge Scully) offered judgment for the gas consumed, but refused it for the meter, on the ground that the agreement was not stamped. In the end, however, the case was adjourned to enable the Company to prove culpable negligence—agreeably with the section in the Company's Private Act which holds the consumer responsible in case of damage to the meter.

When the case was resumed, the Secretary to the Company, Mr. James S. Garrard, asked permission of the Court to put the agreement in again, and produced a letter from the Inland Revenue authorities of which the following is a copy:—

Inland Revenue, Somerset House, W.C.,
June 17, 1910.

Agreement No. 104 *M. J. Fears.*

Sir,—With reference to your letter of the 6th inst., I am directed by the Board of Inland Revenue to inform you that, if the payments for the gas are made only by coins inserted in the slot-meter, agreements similar to that forwarded with your letter are exempt from stamp duty under Exemption 3, sub. tit., Agreement in the First Schedule to the Stamp Act, 1891.

(Signed) H. F. CRUSE,
for Secretary.

The Secretary, Eastbourne Gas Company.

On this occasion, the defendant was represented by a solicitor, who asked his Honour to call upon the plaintiffs to prove culpable negligence; but, after discussion, his Honour held that the agreement must stand, and gave judgment for the plaintiff Company, with costs, upon the ground that Exemption 3 of the Stamp Act, 1891, relating to the sale of goods, covered the claim for gas; and Exemption 1 covered the meter as being, with the fittings and cooker, of a less value than £5. The defendant's solicitor further argued that the Company had not proved that the amount due for gas had not been paid; but his Honour, after hearing the evidence of the fitter, who recovered and produced the index of the meter proving the quantity of gas consumed, held that the terms of the agreement disposed of this argument.

The agreement referred to is as follows:—

EASTBOURNE GAS COMPANY.

I———of———hereby agree to consume the gas and hire the undermentioned fittings of the above Company, from the —— day of—— 19—— and to pay for the same in advance at the rate of —— per 1000 cubic feet—this charge to include the sum of —— per 1000 cubic feet for the rent of the meter, fittings, &c.

And I acknowledge that the following fittings, &c., are the property of the said Company:—

[List appended.]

And I undertake not to disconnect the meter, and to protect the same and the stove and fittings from damage of every kind, and not to remove or otherwise deal with the same in any way whatever without the consent of the said Company; and I further undertake that the said Company's officials shall at all reasonable times have access to the same for the collection of money, or any other purpose.

In case of any defect in the automatic arrangement of the meter, whereby gas can pass, or has passed, without the pennies being placed in the slot, I agree to pay for the gas consumed according to the registration of the meter's index, or if the gas-meter cease to register the quantity of gas delivered, the amount to be charged shall be the same as that of the corresponding period of the previous year.

And I agree to give the Company seven days' notice in writing, of my intention to discontinue the use of the same.

And I further agree that the Company shall be at liberty to remove the said meter and fittings on giving seven days' notice of their intention to do so.

As witness my hand this———day of———19——.

Signature———

Witness:

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Bills Royal Assented.

The House rose for the summer recess last Wednesday, on which day the following Bills received the Royal Assent:—

Abertillery and District Water Board Bill, Bradford Corporation Bill, Bristol Gas Bill, Cambridge University and Town Water Bill, Clydebank and District Water Order Confirmation Bill, Falkirk Corporation Gas Order Confirmation Bill, Fraserburgh Water Order Confirmation Bill, Fylde Water Board Bill, Gas Orders Confirmation Bills (Nos. 1, 2, and 3), Glasgow Gas Consolidation Bill, Havant Gas Bill, Little Hulton Urban District Council Bill, Middlesbrough Corporation Bill, Middleton Corporation Bill, Montrose Water, &c., Order Confirmation Bill, Mountain Ash Water Bill, Paisley Gas Order Confirmation Bill, Pontypridd and Rhondda Joint Water Board Bill, Rhondda Urban District Council Bill, Shirebrook and District Gas Bill, Slough Water Bill, Water Orders Confirmation Bill, Water Provisional Order Bill, Wemyss and District Water Order Confirmation Bill.

Both Houses will resume on the 15th of November.

WATER SUPPLIES PROTECTION BILL.

The Joint Committee of the House of Lords and the House of Commons, presided over by Lord MACDONNELL, resumed consideration on July 5 of the above Bill (see *ante*, p. 349).

Sir EDWARD H. FRASER, the Deputy-Chairman of the Derwent Valley Water Board and a Member of the Water Committee of the Nottingham Corporation, stated that the Corporation supply was obtained by pumping; whereas that of the Board was obtained by gravitation. The Corporation drew their water from the red sandstone. All their shafts, with the exception perhaps of one, were immediately surrounded by colliery works. In reply to the Chairman, who asked if they had found that any prejudicial effect had been exercised on their wells by the pumping of the collieries, he said the supply was not so good as it was formerly—the wells tended to diminish. In the county of Nottinghamshire, collieries were pumping enormous quantities of water to waste; while in other cases they were disposing of it. One colliery company supplied two townships with water; and another supplied water to a single township. These companies would not be subject to the provisions of the Bill. In or near the City of Nottingham, brewers, bleachers, and other manufacturers were pumping millions of gallons daily, and were doing quite as much damage to the underground water as the Corporation. Yet all these would be outside the scope of the Bill. The allegation that damage was done by the pumping was not well-founded. The drafting of clause 3 was extremely poor. It was difficult to understand what its meaning was. The words "notwithstanding anything contained in any Act of Parliament or Provisional Order" seemed to be mere surplusage. If the words gave retrospective effect to the clause, he would object to them. Both the Corporation of Nottingham and the Derwent Valley Water Board had spent enormous sums on their water undertakings. If the clause passed, the Corporation would be in the extremely serious difficulty that, in case of mishap to any of their wells, they would have to apply to Parliament. This would mean delay, possibly of a couple of years. He was not in favour of compensation being given in cases in which injury was done. The Corporation, however, did, in cases in which they injured wells, give a supply. This was a recognition of the principle of compensation. If the compensation

clause should be enacted, it would create special property in underground water, which was not now part of the law of the land. If the clause were made to apply generally and not merely to water undertakers, his objection to it would be diminished. There could not be property in underground water. He objected to the proposal to place the onus of disproof on the undertakers. It was impossible to prove a negative. If water were being taken from a distant area, the right of the people in the distant area should first be provided for; but that provision should be made when the powers were originally granted. Decision as to whether a supply should be given in transit should rest not with the Local Government Board, but with Parliament.

By Sir W. CROSSLEY: There was a certain equity in making good to a man the water that was taken from him. His principal objection to the Bill was that it proposed to legislate specially against water undertakers.

By Mr. HOLT: Clause 3 should only apply, if at all, prospectively; and it would be unfair if it applied to any sources but wells.

By the CHAIRMAN: The water supply of the country should be placed in the hands of National Trustees, a water board, who should supervise the method by which water was drawn from the earth and distributed.

Mr. LEWIS BEARD, the Town Clerk of Blackburn, gave evidence on behalf of the Association of Municipal Corporations. The total population of the boroughs that were represented by the Association was estimated by the Registrar-General in 1908 to be 19,997,556, of whom 16,660,191 were supplied by municipal corporations or joint boards; the remainder being supplied by companies. The Law Committee of the Association had passed the following resolution:—

That, in the opinion of this Committee, the proposals of the Bill, if carried into law, would place unnecessary and oppressive restrictions upon water undertakers, and would discriminate unfairly between public and private water supplies, and that they would thereby increase materially the difficulty and cost of securing an ample, pure, and wholesome supply of water for the population of the country.

Clause 3 was intended apparently to deal only with wells; but, as a fact, it would also apply to gravitation schemes. It would restrict the operations of such corporations as Blackburn—cases in which Parliament had sanctioned a progressive scheme and had left the details to be arranged later. Blackburn, under the authority of Parliament, had bought certain water; but if clause 3 became law, they would not be able to spend a few hundred pounds to carry out the necessary works (certain conduits) to get possession of it, without a further application to Parliament. The clause would also stop the operation of all authorities working under the Public Health Acts. It would have a retrospective effect; and it would stereotype the Lord Chairman's clause, and impose on undertakers the necessity of accepting it as it stood, without an opportunity being afforded them of being heard against it. The clause also discriminated between public and private supplies, and imposed on public water undertakers obligations which were not imposed on private supplies. Clause 4 also discriminated—it shifted the burden of proof, and it altered the general law with respect to underground water to the detriment of public undertakers. If the words relating to proof were deleted, and if the clause were made to apply all round, his objection to it would be minimized. Clause 5 would place an indefinite liability on undertakers—a liability not ascertained at the time that they arranged their scheme. Each scheme should, as in the past, be investigated by Parliament; and any claim for supplies *en route* should be made then. The first claim for a supply should rest with the district to which the water would have flowed naturally had it not been disturbed; the second with the undertakers, and the final with the authorities *en route*. Small bodies might be exempt from the operation of the Bill; and there would be no objection to giving them power to acquire land for water purposes by Provisional Order, provided the procedure was carefully guarded.

Mr. BEALE, the Chairman of the Water Committee of the Birmingham Corporation, and of the South Staffordshire Water Company, also gave evidence on behalf of the Association of Municipal Corporations. He stated that, as Chairman of the South Staffordshire Company, he had accepted the principle of compensation for injury to private water supplies. Clause 3 imposed an unnecessary obligation on small undertakers to go to Parliament. Of course, large water undertakings should apply to Parliament. Alternative and cheaper ways would be private agreement or Provisional Order. The local inquiry which preceded the grant of a Provisional Order provided all the publicity necessary. The retrospective action of clause 3 was very objectionable. There might be great confusion and litigation in determining whether earlier Acts had sufficiently specified works. There would be difficulty, too, in specifying details of proposed works. It would be possible for Parliament to state the maximum quantity of water that might be taken. It would, however, be a great evil to limit the quantity that might be taken. Such a limitation had the effect of driving undertakers further afield in order to obtain water, which meant that the consumer or ratepayer had to pay more. He objected to having to specify the works, but would not object to having to specify the nature of the works. He preferred that the Lord Chairman's clause should be inserted and modified, if necessary, according to the circumstances of each case, to stereotyping it in a Public Act. In the South Staffordshire Company's Act, there was a compensation clause; and as it had been made retrospective, the Company had had to deal with over a hundred claims. In most of the cases, however, they had not had any difficulty. In their Act, the limit of protection was 2½ miles. Many private water supplies were liable to pollution, and they were often intermittent. An arbitrator should therefore be directed to consider whether a supply in respect of which a claim was made was or was not effective. In South Staffordshire, they tried to put each claimant as nearly as possible in the position in which he was before the Company drained his supply. As a matter of fact, they invariably put him in a little better position than he had been in. With regard to giving water in transit, the result of clause 5 would be, in the case of Birmingham, that something like thirty authorities would have the right to demand water in bulk, and sell it in competition with them. This section should be limited. In the case of Birmingham, every water authority within 15 miles of the aqueduct had the right to a supply in bulk; but they only obtained that after 25 gallons per head per day was got for the Birmingham area. They had applications from time to time from such authorities for terms; and then they weighed the cost of getting it from the Birmingham mains as compared with the cost of getting it for themselves. It was purely a commercial question. As to giving off water *en route*, he did not know that the people through whose district the pipes were taken had any particular right to obtain a supply; but all these cases should be decided judicially as they arose. It was impossible to lay down a general rule. With regard to the compensation question, until there had been a very wide inquiry as to the operations of water abstractors, there ought not to be general legislation.

By Mr. J. H. LEWIS: In many cases the South Staffordshire Company had paid compensation in money; but the amounts were not large.

Mr. JOHN BOND, the Clerk to the Kettering Urban District Council, stated that he spoke on behalf of the Urban District Councils Association, which represented 546 of the 815 urban councils of England and Wales. Clause 3 would prevent any urban district council from even sinking a well or driving an adit without obtaining an Act of Parliament. It would therefore prevent the councils of urban districts with small rateable values from extending their water supplies, inasmuch as an Act cost any amount up to £1000. The cost of an Act would in many cases be out of all proportion to the cost of the proposed water supply. These councils would therefore be seriously prejudiced in respect of their statutory obligations if the clause became law. Authorities supplying under the Public Health Act should be excluded from the operation of the clause; and the retrospective operation of the clause should be deleted. The Association also held that it would be impossible to specify works, in detail, when applying to Parliament. There was a great difference between enacting clause 3 as part of the general law and in dealing with it on its merits in connection with applications to Parliament. The clause ought not to be stereotyped. It would be an advantage if urban councils, especially the smaller ones, had power compulsorily to acquire water rights by Provisional Order. Urban and rural district councils in Ireland already possessed this power. The Association did not, as a general principle, admit that there should be compensation for damage done. They had the strongest objection to clause 4. It would alter the general law with regard to underground water. The clause would give rise to innumerable claims, and would result in endless litigation and expense. It would be acceptable if it were altered so that a water undertaker might claim compensation from a private individual abstracting water, and so that a claimant had to prove his case. The Association thought clause 5 went much too far. When a local authority went outside its district for water, the Association agreed that the district from which the water was taken should be entitled to a supply on favourable terms. They did not agree that any authority *en route* should be entitled to a supply. If such a supply were given, the receiving authority should furnish a portion of the capital cost. Otherwise the debt of the authority undertaking the scheme might be increased to such an extent that they might have to pay increased interest for loans.

Mr. SEYMOUR WILLIAMS, giving evidence on behalf of the Rural District Councils Association—a body which comprises 127 rural district councils—said it was the opinion of rural councils that they should be excluded from the operation of the Bill. A rural council had no power to apply to Parliament except in regard to certain specified matters in respect of which they could proceed by way of Provisional Order. They were under statutory obligation to give a proper supply of water; but if clause 3 were enacted, it would, in many cases, be impossible to fulfil that obligation. They often acquired land for the purpose of sinking wells; and if they could not acquire it by agreement, they acquired it compulsorily by means of a Provisional Order. They should possess similar powers with regard to the acquisition of water rights. Clause 3 would mean an application to Parliament in respect sometimes of trivial matters. The Association thought that if the compensation clause were made law, it would be such a hindrance to small authorities as to make it impossible for them to carry on the work of supplying water. The supply to a small rural parish might cost £100 or £200; and the compensation claims might amount to much more. Asked if he opposed altogether, on behalf of his Association, the grant of compensation, he said that was the view of a large number of Associations. Opinion on this point was, however, not unanimous. Where a district, in which a watershed existed, was tapped by an outside body, provision, on satisfactory terms, should be made for supplying the district with water.

(To be concluded.)

A WELSH WATER BOARD BILL.

It will be remembered that a Bill is before Parliament in which it is desired to constitute a Water Board consisting of representatives of the District Councils of Abertillery, Abercarn, Risca, and Mynyddislwyn. It first passed through the Upper House; and when before the Commons Committee, there was opposition from the Llewellyn Trustees and the Lancaster Steam Coal Collieries Company. The scheme provides for new works; and the necessity is established beyond question. The first-named opponents did not want the proposed new Water Board to take 4½ acres of a farm required for the works without purchasing the whole of their 42 acres. The Lancaster Collieries Company, it was alleged, were the cause of most of the local water difficulties. They were paid £7000 to refrain from working the coal under the Cwmtillery reservoirs, and were to have 300,000 gallons daily compensation for loss of a stream that it was computed would turn into the reservoir 240,000 gallons daily. But they had worked the coal all round the reservoir to such an extent that it lost 90,000 gallons a day through leakage, and it was positively unsafe. The Company were also charged with wanting now to impose conditions upon the Board that would make working quite impossible. Engineers—Mr. Theodore Vachell, Mr. Baldwin Latham, and Mr. Henry Rofe—gave evidence of the peril that would be occasioned by attempting to maintain the full capacity of the reservoir. The Committee practically rejected the whole opposition—only giving to the Lancaster Company protection in relation to surface works.

LEGAL INTELLIGENCE.

THE WEST HAM CORPORATION AND THEIR FINANCES.

Illegal Overdrafts and Application of Moneys Borrowed.

In the Chancery Division of the High Court of Justice a short time ago, Mr. Justice Neville was engaged for some days in hearing an action brought by the Attorney-General, at the relation of the India-Rubber, Gutta Percha, and Telegraph Works Company, who are large ratepayers in West Ham, against the Corporation of the borough, their Treasurer (Mr. Patterson), and their Bankers (the London and County Bank), to obtain a declaration that certain overdrafts obtained by the Corporation from the bank for their electricity undertaking were unauthorized and illegal.

The statement of claim set forth (*inter alia*) that the Corporation's overdraft at the bank on March 31, 1908, was £90,949 on capital account and £44,952 on revenue account, and that, of these sums, £20,817 on capital account and the whole of the £44,952 had respectively been borrowed without the sanction of the Local Government Board, and were wholly unauthorized and illegal; that the Corporation's illegal overdrafts on capital and revenue account at the bank had been continuous and increasing during the three years ending March 31, 1908; that the bank had each year charged and paid themselves interest on these illegal overdrafts; and that these payments of interest were defrayed out of the fund or rate applicable to the general purposes of the Public Health Act, 1875, were illegal, and breaches of trust to which the bank were privy. The statement of claim further set forth that the Corporation kept one general account at the bank, which in fact comprised, and was an amalgamation of, ten different accounts in respect of separate undertakings under various Acts of Parliament; that the moneys received for each undertaking were held upon a separate and distinct trust from every other account of the Corporation, which the defendants well knew; that this amalgamated account had been wrongfully applied in reduction of illegal overdrafts during the period in question; and that the bank had paid themselves interest on these illegal overdrafts during the period in question to the extent of some £14,000. The plaintiff claimed (*inter alia*) declarations that the above transactions were illegal and *ultra vires;* and that the defendants Patterson and the bank might be ordered to restore to the funds of the Corporation the alleged illegal overdrafts and all payments of interest upon them. The defendants denied all the allegations of the plaintiff.

Sir A. Cripps, K.C., Mr. Macmorran, K.C., and Mr. Scholefield appeared for the plaintiff; Mr. Danckwerts, K.C., Mr. Morten, K.C., and Mr. Tomlin represented the Corporation; Mr. Buckmaster, K.C., and Mr. Methold watched the case for the bank.

During the trial of the action, the plaintiff and the bank came to an arrangement whereby, upon payment by the latter to the Corporation of £7000 in respect of the interest on the balances of overdrafts, and upon the bank agreeing to pay plaintiff the difference between party and party costs and indemnity costs of the plaintiff, further proceedings against the bank were stayed. The arguments involved the construction of various Acts of Parliament and the consideration of accounts of much complexity during the three years in question.

Mr. Justice Neville delivered his reserved judgment just before the rising of the Court for the Long Vacation. Having recapitulated and commented upon the allegations contained in the statement of claim, he said the Corporation appeared to have considered, and they certainly acted, as though they were entitled to use moneys borrowed under specific powers, not merely for the purposes for which the powers were bestowed, but for any purpose to which funds of the Corporation could lawfully be applied, so long as they kept proper accounts of the expenditure. He thought the correspondence and applications to the bank showed that they intended so to apply the bank's advances from the first—in fact, the overdraft was allowed on all the accounts, and a general balance struck daily upon them all. In his opinion, this view of the position of the Corporation was erroneous. He thought if they raised moneys under a borrowing power, they were bound to apply them for the specific objects indicated by the Statute. On this ground he considered that the obtaining of the overdraft was *ultra vires* of the Corporation. Upon the point whether, having regard to the statutory provisions under which corporations are enabled to procure the funds to discharge their liabilities, they were entitled to borrow money by way of overdraft for general expenditure—at all events, except under special circumstances—he reserved his decision. The impropriety of municipal corporations incurring large expenditure on capital account in anticipation of sanction for loans not obtained, was well illustrated in the case before him, where the Corporation failed to obtain sanction for a loan in respect of an expenditure of upwards of £10,000 on the electricity account, with the result that they were driven to make a levy for the amount—in his opinion an illegal levy, inasmuch as the proceeds were applied in payment of liabilities incurred more than six months before the levy was made. The bank having agreed terms with the plaintiff, he would refrain from discussing what, upon the evidence, their position would have been in respect of their advances. On March 31, 1908, the general account of the Corporation with the bank was largely overdrawn—to the extent of some £38,000, after deducting the amount due to the consolidated loans fund, but which had from time to time been paid into the account in reduction of the overdraft, in accordance with an arrangement with the bank. In his opinion, the application of the amounts due to the consolidated loans fund in reduction of the overdraft was illegal. Though plaintiff was not entitled to all the relief he claimed, he proposed to declare: (1) That the overdraft obtained from the bank for general purposes in respect of borrowing powers granted for specific purposes was *ultra vires* and illegal. (2) That the application of money due to the consolidated loans fund in repayment of such overdraft was *ultra vires* and illegal. (3) That borrowing of money from the bank for the purpose of the electricity accounts, otherwise than in the exercise of borrowing powers with the sanction of the Local Government Board, was *ultra vires* and illegal.

The Corporation and the defendant Patterson must pay the costs of the action.

Mr. Danckwerts asked his Lordship to express the opinion that there was nothing to prevent the Local Government Board giving their sanction now to a loan. His Lordship replied that he thought this was so obvious that he ought not to say anything about it. Mr. Danckwerts pointed out that the Corporation would require some time to set matters straight, and asked that the operation of the judgment might be suspended till March 31 next year. His Lordship, however, did not think there were any means of doing this, as he had made a declaration, and not granted an injunction.

WATER SUPPLY TO FACTORIES.

An Important Decision.

In the Westminster County Court last Friday, his Honour Judge Woodfall gave judgment in the case of *Metropolitan Water Board v. Colleys Patents, Limited*, which had previously been before him. It was a claim for four quarters' water-rate in respect of defendants' factory in Marine Street, Bermondsey, S.E. The Board charged £21 4s. for a "domestic" supply of water, and defendants paid into Court £9 2s. 1d. for a "non-domestic" supply. The amount sued for was for water furnished since the Board's Charges Act came into operation; the defendants having previously been supplied by meter. Section 8 of the Act sets forth that the Board shall supply water for domestic purposes at a rate per annum that shall not exceed 5 per cent. on the rateable value of the premises; and section 25 defines the words "domestic purposes" as not including (among other things) water for a gas-engine or for any "trade, manufacture, or business." It was contended by Mr. A. B. Shaw, for the plaintiffs, that the supply to the defendants was for domestic purposes, being for drinking by the factory hands, and for lavatories, cleansing, &c. The water was also used for a gas-engine. Mr. C. A. M'Curdy, M.P., on the other hand, submitted, on behalf of the defendants, that the supply was for the purposes of trade only.

In giving judgment, his Honour said the point was whether the defendants were entitled to the exemption under section 25 of the Board's Charges Act, or whether they were bound to pay for a supply of water, under section 8 of that Act, on the rateable value of the premises. He had delayed giving judgment to see what the Court of Appeal decided in the London, Brighton, and South Coast Railway Company's case [see *ante*, p. 338]; but he did not derive much assistance, as the Lords Justices treated the matter entirely from a "railway purposes" point of view. In that case, which gave him no difficulty, his decision was upheld. In the present one, the water was supplied to the defendants for use in their factory, where they employed a large number of hands. No one lived on the premises, and they were in no sense a dwelling-house. The defendants were bound to have the supply of water to comply with the provisions of the Factory Acts, which compelled them to have sanitary conveniences for their employees; and it could not be said that the water was used otherwise, except a very small portion that was taken for a gas-engine. But defendants could not carry on their business without complying with the provisions of the Factory Acts; and he took the view that a domestic supply of water meant a domestic supply in the popular sense. It seemed to him contrary to common sense that a supply of water to a factory was in any sense a domestic supply within the meaning of the Act. He repeated what he said in the Railway Company's case—that, though flushing the sanitary conveniences was domestic in a certain sense, he did not think it was so to the extent of precluding the defendants from availing themselves of the exemption contained in section 25 of the Charges Act. He found that the water was supplied to defendants for the purposes of their business; and he entered judgment for them, with costs.

It was intimated, on behalf of the plaintiffs, that there might be an appeal.

AN UNSUCCESSFUL CLAIM BY A GAS WORKMAN.

At the Greenwich County Court last Friday week, a workman, named Henry Sharp, claimed damages against the South Suburban Gas Company for breach of contract. Plaintiff alleged that he entered into a contract of service with Mr. S. Y. Shoubridge on behalf of the Company for a definite twelve months "if he should remain sober, honest, and industrious, and able to do the work allotted to him." He complained that he was discharged within five months. His wages were 26s. 6d. per week; and he claimed £35 15s. 6d.

Mr. Whiteley, in the course of his opening, said that plaintiff took on a load of coke a couple of wheels to oblige another workman, named Key, supposing that they had been acquired honestly. He was "suspended," and afterwards was not taken back into the Company's employ. He was, however, given a testimonial describing him as willing, sober, and industrious.

Plaintiff, giving evidence, said he had been employed by the Company for nine years; and up to April 26 was paid his wages of 26s. 6d. a week. About the beginning of March, a fellow-workman, named Key, asked him to take to his home a pair of wheels; and they were placed on top of a load of coke he was taking out for delivery in the district. He did not know where Key got the wheels from; but he knew they were the Company's property. He expected Key had bought the wheels and paid for them. He gave the wheels to Key's wife. Later, when he was asked if he had taken a pair of wheels, he could not speak at first, and asked: "Do you mean two or three weeks ago?" Then he told the official he had taken the wheels for a

man he knew by sight, who had taken them from a scrap heap. He was thereupon discharged.

Mr. Gutteridge (for the Company): You knew that if you took anything out for a workman you would have to get a permit?—Yes.

When you got the pass for the coke, did it not occur to you that you should get a pass for the wheels?—I never gave a thought to it. I expected the man to bring it.

It is not the habit of your fellow-workmen to buy wheels and take them home, is it?—I have seen them take old packing cases.

Henry Key said he had been a fitter for ten years in the employ of the Company. He took the wheels off the scrap heap, as he wanted them to attach to a box to make a barrow for his child. The result of it was that he was discharged. He valued the wheels at about 8d. The Company first heard of the matter through an anonymous letter. One morning he asked Sharp if he was going to Forest Hill, and he said he was. He then gave the wheels to him to take to his (Key's) house. In reply to questions by the Judge, he acknowledged that he would not himself take them home, because he would want a permit, and Sharp also should have had one; so that he knew he might be getting Sharp into trouble.

Mr. Shoubridge, giving evidence, said that on April 26 he received an anonymous letter, and both the men came before him. He had already had a report from Mr. Whimster and Mr. Waller, assistant and foreman, and he told them he had had a letter to say the charges were admitted to be true. He said he was surprised that men who had been so long in the service of the Company had done anything of the kind. Key said he was sorry; he saw how wrong and foolish it was, but hoped mercy might be shown to Sharp, because he had led him to do wrong. Witness then asked Sharp why he took the wheels out; and Sharp said Key asked him to, and he thought Key had bought them. He said he did not take a pass because he did not think about it. He was told he must have known it was wrong to take anything from the works, without saying a word about it, to a workman's home. Witness told them that he had no alternative but to discharge them both. Key again begged witness to let Sharp remain. He did not care for himself, but he was very sorry for the trouble he had brought upon Sharp. Witness gave instructions that they should be paid off at once. He had never known of men purchasing such things as wheels. The only thing had been when they had been allowed to have some packing-cases.

Mr. Whiteley (for plaintiff) urged that no Jury would find plaintiff guilty of "dishonesty" through the careless act which brought about his dismissal. All the evidence was to the effect that Sharp broke the rules; but there was no evidence of guilty knowledge.

His Honour, in the result, found for the defendant Company; giving judgment for them, with costs.

Liquidation of R. England and Co., Limited.

The Official Receiver in the Companies Winding-Up Division of the High Court of Justice has issued particulars under the liquidation of R. England and Co., Limited, of No. 59, Mark Lane, E.C. It appears that a statement of affairs has been filed showing gross liabilities as regards creditors amounting to £587, of which £464 is due to unsecured creditors. The assets consist of a patent, valued at £20, from which £13 13s. 1d. has to be deducted for the claims of preferential creditors payable in full; leaving the net assets at £6 6s. 11d., and a deficiency of about £458. As regards shareholders, the paid-up capital of the Company, which was formed with a nominal capital of £2000, in 1900 preference shares of £1 each and 2000 ordinary shares of 1s. each, to carry on the business of chemical and fertilizer merchants, and to work two patents relating to inventions for methods of treating sewage sludge for the production of manure and treating sulphate of ammonia, is £337, to which has to be added the above deficiency of £458; making a total deficiency as regards shareholders of £815. The Company carried on business at a loss; and no accounts have been prepared.

Suicide by Coal Gas.—As the result of nervous breakdown and sleeplessness brought about by overwork in his business, Mr. Charles Riby, a clothier, of Hessle Road, Hull, committed suicide last Thursday at Scarborough by inhaling coal gas. At the inquest, the Jury returned a verdict of "Suicide while temporarily insane."

Rochdale Corporation Gas-Coal and Oil Contracts.—At their meeting last Wednesday, the Gas Committee of the Rochdale Corporation accepted tenders for the supply of 55,000 tons of coal required at the gas-works during the ensuing year. The average price per ton is rather higher than was the case a year ago; but the difference is said not to be more than £1000. At the same meeting, tenders were accepted for 500 tons of oil for use in the manufacture of carburetted water gas; the prices being slightly more favourable than last year's.

Gloucester Water Supply.—The Gloucester City Council have lately discussed reports as to increasing the city water supply from the Newent works, and, as a preliminary, making a trial boring on land of the Corporation or other property at or near Ketford. It was stated that the Town Clerk (Mr. G. S. Blakeway) had suggested to Messrs. Hastie, Solicitors to Lord Beauchamp, that the Corporation should make a trial boring upon certain land belonging to his Lordship, and that the completion of the option of purchase should be deferred until the boring had been tested. Messrs. Hastie replied that before they could advise Lord Beauchamp to allow any trial boring they would require the Corporation to enter into a binding contract that in no event would they afterwards apply for compulsory powers in regard to any part of his property. The Estates and General Purposes Committee instructed the Town Clerk to inform Messrs. Hastie that, under the circumstances, the Corporation must proceed independently of Lord Beauchamp. The Council adopted a recommendation of the Committee to enter into agreements with Mr. Frank Ricardo, demising to the Corporation land at Ketford, with power to make a trial boring there, and giving them the option to purchase land and easements on terms similar to those provisionally arranged with Lord Beauchamp.

MISCELLANEOUS NEWS.

THE GASLIGHT AND COKE COMPANY.

The One Hundred and Ninety-Seventh Half-Yearly Ordinary General Meeting of the Proprietors was held last Friday, at the Chief Office, Horseferry Road, Westminster—Mr. CORBET WOODALL (the Governor) in the chair.

The SECRETARY (Mr. Henry Rayner) read the notice convening the meeting; and the seal of the Company having been affixed to the Register of Proprietors, the report (given in the "JOURNAL" last week) was taken as read.

FAVOURABLE RESULTS.

The GOVERNOR: Ladies and Gentlemen, It now becomes my duty to move the adoption of the report and accounts; and I think, in doing so, we may fairly congratulate ourselves upon the results of the half-year's work. Circumstances outside our control have favoured us. The prices of materials, for instance—both those which we have bought and most of those which we have sold—have been in our favour. But, beyond this, there is no slacking in the progress resulting from careful management and zealous work. For the first time, our accounts include those of the West Ham Company; but, thanks to Mr. Bevis, they are so compiled that comparison with last year presents no difficulty. As with the negotiations and the parliamentary settlement, so with the routine of the amalgamation—all has proceeded easily and pleasantly, both at Stratford and in London. We are making rather considerable alterations at the Stratford works, which will be completed in time for the coming winter, and which will add materially to the economy of production. The demand for gas in the West Ham area is increasing at a satisfactory rate. I am able to say without hesitation that the amalgamation is operating to the advantage of the allied Companies.

REPORT AND ACCOUNTS.

I turn now to the accounts; and I will deal, first, with the capital. So long as the number of our consumers increases, expenditure must also increase; but I am glad to point out that the additions from year to year are small. Of the £750,000 authorized in 1903, we have issued nothing; and of the credit balance in hand at the time of the passing of that Act, which was £844,920 in all, we have still left unexpended £411,640. In the half year, our expenditure for capital purposes was £53,060, of which more than £50,000 was upon mains, meters, and stoves. Depreciation amounted to £63,000; so that in the account period there is a credit balance to capital, apart from the contribution to the redemption fund. The £13,677 written off plant account represents certain buildings, &c., demolished—chiefly at St. Pancras and Haggerston, from which stations the manufacture has been transferred to Beckton. The good effect of the careful nursing of capital is seen in the fact that the charge for dividend is less than it was five years ago by nearly 1d. per 1000 cubic feet sold, though, for the same period, the rate of dividend paid has increased from £4 8s. to £4 13s. 4d. per cent. This 1d. per 1000 cubic feet represents the handsome sum of £100,000 per annum. A most gratifying feature of the revenue account is the evidence of increasing business. Our output of gas is 1¾ per cent. larger than in the June half of 1909; and the average on the year comes to about 3·3 per cent. The reduction in the price made on Jan. 1 last meant a deduction from revenue of £54,000 on the half year. The actual loss was £25,891; the difference being made up by the increased sale. Against this reduction in revenue for gas, we have to set an increase in rentals for meters, stoves, and fittings, and also in each item of residual products—coke, breeze, tar, and ammonia. On balance, the reduction of the gross income is £3203 only. It will be noticed that there has been a transfer from the item of rental for fittings to that of rental for meters. Hitherto, no credit has been given to the latter for rent of automatic meters; this having been included with fittings. The change more correctly represents the allocation of the extra charge made for gas by prepayment meters. On the other side of the accounts, under the head of manufacture, every item is favourable. Coal and oil together have cost less by £59,970; coke for carburetted water gas, salaries, wages, purification, and repairs are all down; the total improvement on the corresponding half year being £117,270. The saving on coal and oil has been due to the lower prices paid, supplemented by further improved carbonizing. Distribution charges have been higher by nearly £40,000. Of this, about £10,000 is the consequence of increased work and reduced charges for maintenance of incandescent burners and mantles. The cost of this work is included under the heading of repairs of mains, &c.; and against this, the payments by consumers are a credit. We are desirous of getting all these burners under our inspection and maintenance. The advantage to the consumer far exceeds the payment he is asked to make; while, to the Company, every light burning at the highest efficiency is a valuable advertisement. The cost of maintaining meters and stoves must grow with the growth of the number in use. Of meters, we have 30,000 more than at this time last year.

ASSESSMENT.

There is a charge of £1388 on account of our expenses in connection with the quinquennial revaluation of the Company's property. This is a matter of the utmost importance to us, and is being gone into thoroughly before the various Assessment Committees in the Metropolis.

RETIRING ALLOWANCES.

The item of £10,500 for retiring allowances represents the amount paid to the West Ham Directors and Auditors, as part of the scheme of amalgamation. The total expenditure on revenue account has been £1,571,048, or £68,545 less than in the same period last year.

RESERVE AND OTHER FUNDS.

The reserve fund is invested in India 3 per cent. stock. The market value of this security has fallen since our purchase was made; and we have written-down the value in our books accordingly, and have brought from net revenue the sum of £10,000 necessary for the purpose. The reserve fund has been still further affected by the West Ham

amalgamation. That Company had a balance of £15,869, to be surrendered to us; but out of the joint fund £27,600 was devoted to the purchase of ordinary stock to be allocated to the shareholders as part of the purchase consideration. This accounts for the fact that the reserve fund account appears at a lower rate this half year than it did in the corresponding half year. From the same account (net revenue) we have taken further a contribution of £20,000 to the insurance fund; and the usual £10,000 has been deducted from the dividend, and put to the credit of the redemption fund. Each of these appropriations is, of course, a contribution to the financial strength of the Company. The outcome of it all is that, after paying all preference charges and the contributions to redemption, reserve, and insurance funds, we have a balance on the half year of £430,150. The carry-forward at Christmas was: By the Gaslight and Coke Company, £456,993; by the West Ham Company, £32,747—in all, £489,740.

DIVIDEND AND REDUCTION IN PRICE PROSPECTS.

The total sum available for distribution is thus £919,890. Out of this, the Directors recommend a dividend on the ordinary stock at the rate of £4 13s. 4d. per cent. per annum, which will absorb £377,520; and will leave £542,370 to the credit of the current half year. A shareholder writing to me the other day commenced his letter by saying that the accounts appeared to him to be not unsatisfactory. In view of the figures I have given, I think we may agree that the writer's words of approval were not extravagant. The year on which we have entered will have to bear the burden of dearer coal. But, on the other hand, our purchases of oil have been at lower rates; and the value of residuals is so far well maintained. Looking at all the circumstances, I can safely promise that the price of gas will be again reduced from Christmas next.

STAFF TRAINING AND LADY DEMONSTRATORS.

Among the causes which have led to the improvement apparent in the Company's position, not the least is the better training and education of the outdoor staff and the more intelligent service of the public consequent thereon. During the summer term, the fitters are being thoroughly grounded in the simple principles of their work, and also taught how to reply to the inquiries of the consumers with whom they come into more intimate contact than do the inspectors and superior officers. The staff instruction in the winter is yielding increasingly good results, of which evidence is given in our own examinations, and in the success of our candidates in passing those of the City and Guilds of London Institute. Mr. Webber reports that the spirit of the young officers is excellent. A fresh batch of twelve apprentices were recently selected, making 54 in all who are now receiving a thorough practical training in the work and duties of fitters. The promise so far is very good. The service which was instituted some four years ago, of lady demonstrators, who call upon consumers to advise them and their servants as to the economical use of gas for cooking, continues to give great satisfaction, and is doing a very useful work. Instruction was given to 6420 consumers during the past half year; making a total of over 30,000 demonstrations since the institution of the system.

CO-PARTNERSHIP SUCCESS.

But beyond these aids, and applying to all branches and all grades of the service, is the stimulus of mutual interest and effort which has been advanced by co-partnership. We have now had a full year's experience of the system; and we are finding our hopes realized. One of the engineers explained to me a few days ago the remarkable success of the operations at his station by saying that all the men took keen personal interest in the work, and they desired to be kept informed as to whether they were holding their own in comparison with others. The number of co-partners is now 9010; and the total amount of their interest in the Company is £66,377.

PORT OF LONDON AND SMOKE PREVENTION BILLS.

Two Bills of a public character and affecting the Company's interests have been considered by Parliament. One—the Port of London Bill—was duly passed after prolonged inquiry. If, under the new authority, the Port of London receives the attention and the improvement which it urgently needs, London as a whole will greatly profit, and the Gaslight Company with it. Meantime, we must, with a hopeful mind, pay some duty, which we hope will be small, on coal imported from the North. The second Bill was intended to make more drastic the restrictions on smoke from factories. The proposals of the Bill would have seriously hampered the operations of the Company, although the quantity of smoke for which we are now responsible is small. Our efforts are constantly directed, and with increasing success, to making our works as inoffensive as possible to the neighbourhoods where they are placed. The stoking machines now in use do their work noiselessly; and the system of continuous carbonizing in vertical retorts, which we have adopted, will eventually do away with all smoke and practically all steam. Gas companies rightly claim to be smoke abatement institutions on a large scale, distributing, as they do, two smokeless fuels—gas and coke; and we shall be glad when our factories are an example to others on the same ground.

STAFF AND OTHER LOSSES.

My last words will be somewhat sad ones. We have to announce, with much regret, the death, on July 19 last, of Mr. G. C. Trewby, for many years a familiar figure at these meetings. He had been identified with the gas industry since 1853, when he became a pupil of the then Chief Engineer of this Company, Mr. F. J. Evans. With the exception of a few years' interval, Mr. Trewby served this Company from that date until the close of the year 1904, when he retired on an annuity. Much of Mr. Trewby's work was conducted at Beckton, when that station was, comparatively, in its infancy. From 1884 to the date of his retirement, he occupied the position of Chief Engineering Officer of the Company. As the result of an official visit paid by him to America in 1889, upon which I accompanied him, the manufacture of carburetted water gas was inaugurated in England by this Company. The loss of another old and esteemed officer has to be recorded in the death, early this year, of Mr. T. H. Solomon, after a service of forty years with the Company—the latter part in the important post of Superintendent of the Rental Department. Mention must also be made, with regret, of the death of Sir Robert Giffen, K.C.B., who, for thirteen years, acted as the Official Auditor (appointed by the Board of Trade) of this Company's accounts, and whose work as a statistician was so widely known and admired. He is succeeded in the duties of Auditor by Sir Alfred E. Bateman, K.C.M.G., whose signature appears for the first time on the accounts.

PUBLIC LIGHTING.

One point I have not dealt with, and that is the arrangement we have come to with the Corporation of the City of Westminster for the improved lighting of their district. We are very pleased to have the opportunity of showing what gas can do in the illumination of a large area, such as the City of Westminster is responsible for; and, judging by the work so far done, I feel sure that the effect will be such as to surprise the inhabitants of London generally. A similar arrangement has been made with the Corporation of Finsbury; but I have to report, with regret, that the Corporation of one of the northern boroughs have decided, in the interest of their own electrical department, to substitute electricity for gas. The tender of this Company would have given to the borough an amount of light 70 per cent. in excess of that which they will enjoy, when the change is made, and at no more cost. But these are considerations which do not weigh when the supposed interest of the electric department is considered. The work of negotiation with the different Municipal Councils has been carried out exceedingly well by our controller of gas sales, Mr. Goodenough; and we owe him our thanks for what he has been, and is, doing.

CONFIRMATION OF THE REPORT AND ACCOUNTS.

I now beg to move: "That this meeting do agree with, and confirm, the report of the Directors and the Auditors' report and statement of the accounts of the Company as transmitted to the proprietors on the 28th ult."

Mr. Ulick J. Burke (the Deputy-Governor) had much pleasure in seconding the motion.

SHAREHOLDERS' REMARKS.

Mr. E. Kimber said, before the motion was put, he should like to make one or two remarks. The Governor had told them that the amount carried to the redemption account was £10,000; but if this was compared to the capital of £27,000,000, it appeared to be very small, as it was only 1·247th of the capital. He understood the redemption fund had been instituted for the purpose of redeeming the whole of the capital; and he would suggest that, instead of redeeming the capital in 247 years, it should be done in half that time—say, 120 or 130 years. But what would be the state of the coal supply of the country at the end of that period? No doubt this question did not enter the minds of ordinary gas shareholders; but it must enter into the minds of trustees, who never died. It therefore behoved them to look to the far future. The anthracite coal in South Wales was said to be nearly exhausted.

The Governor: Is it necessary to discuss the question of anthracite coal?

Mr. Kimber said perhaps not; but there was a question whether gas coal would last for more than 60 or 70 years longer. It was very satisfactory to find that owing to the increase of the motor trade and the rubber business, the result had been to diminish the supply of stable manure, which would create a demand for sulphate of ammonia, and consequently increase the price of their residual products. The demand for oil, too, would increase the demand for tar. On the other hand, there were things militating against the progress of the Company—for instance, the increase in the rating. All rating authorities looked upon gas companies as fair game for rating. But they should fight them with their own weapons. Electricity companies had got their representatives upon the borough councils; and he could not see why gas companies should not do the same, especially as they were very large ratepayers and were quite as much entitled to be considered as electricity companies. Practically, the Gaslight and Coke Company had not a single representative on any borough council.

The Governor observed that, as a matter of fact, this statement was not correct.

Mr. Kimber said he was very glad to hear it; and he would like to know to what extent gas companies were represented on borough councils. He thought borough councillors imagined that, because electricity was a fine light, it was everything. But they knew nothing about the difference between the cost of producing electricity and gas. Consequently, he was glad to see a statement, which had been circulated by the Company, pointing out the difference. The circular had had a great effect upon many of his clients. He had also heard that electricity companies boasted that they had a lamp which would beat the whole of the gas companies in the Metropolis. He did not know whether this was true or not; but he should like to hear from the Governor if he had any information to give upon the point. One thing was true, and that was that the whole of the Metropolis had been most egregiously taken in by the electric light. He believed that the electric light was generally throughout the country receiving its quietus from gas companies; but, still, it would not do to remain quiet in the future.

Mr. W. A. Hounsom said his only regret was that the attendance of proprietors was so small when they were, for the first time, dealing with the result of the amalgamation. To his mind, the outcome was very satisfactory, especially remembering that they were dealing with only six months' working. It would have been quite possible for the accounts not to have come out so well; and he considered it was a great tribute to the foresight of the Board, as well as the way in which the work had been carried out in the interests of all parties. He also thought they might hope for happy results to take place from the amalgamation. While not inclined to forget the advantages they had, he did not wish to minimize the work the Company had to do in the future. At one time, they looked forward to a decrease in consumption owing to the introduction of the incandescent mantle; but the decrease had been supplemented, even if it had not been accompanied, by an increase in consumption. During the past half year, they had expended practically nothing on buildings and erections, which showed that the storage plant was sufficient. He did not forget

how much they owed to high-pressure distribution; but no doubt this enormously increased the work the mains could do. The progress which the Company had made might be summed up in one word, "sympathy"—sympathy between the shareholders and the Board, between the Board and its employees, and between the Company and its consumers. This was the greatest feature in the progress of the past few years; and he thought they should pay the tribute which was due to those who had taken hold of the possibility which had come to their hands. He did not very much believe, although it might be called rank heresy to say so, in either profit-sharing or the sliding-scale. It might bring the master and the man, and the Company and its consumers, into closer touch; but he thought these days had now gone by. Under existing conditions, they were approximating ideals in two great principles; and if they could go further on the line of co-operation of all parties connected with the gas industry, they need not take the somewhat pessimistic view the former speaker had taken. If the great principle of co-partnership were to be carried out, there must be sympathy between all parties. No human rule was perfect. Times might come when storm and stress would arise. Still, if they went forward and had a development of sympathy, they would find it best for all parties. It would come home to them in the shape of dividend, and it would be the best thing for all engaged in the commercial enterprise of the country.

Colonel RODNY MUNDY, referring to the harassing test which all gas companies had to undertake, said the object of the test was for light, not heat, and to see if the gas supplied possessed the necessary quality; but it appeared to him that the test would be more reasonable if it was for heating power. Gas was not now required so much for lighting purposes as it was for heating. With the incandescent mantle, gas was capable of giving an excellent light; but it was used more for heating than for lighting purposes. No doubt, they were constantly put to great expense in the testing of gas for lighting purposes, when really it was wanted only for heating; and he hoped some progress would be made in abolishing this troublesome test. The only other question he wished to ask was how far they were advancing towards paying off obsolete capital?

Mr. H. C. PELLY congratulated the Board upon the excellent report and statement of accounts, which he had studied very carefully; and he confessed that he was not at all disappointed. In spite of the large sum represented by the reduction in the price of gas, the income of the combined Companies was only £3000 less than in the corresponding six months; while there had been a saving of over £68,000. This was sufficient proof that the policy which prompted the amalgamation was a right and proper one, and that the hopes and expectations of every one were in a fair way of being realized.

THE GOVERNOR'S REPLY.

The GOVERNOR: If no other observations are to be made or further questions asked, I will reply to those already made. Beginning with the last question put, as to the test, as you are aware, this Company have made some advance in the direction of remodelling the test. When last we went to Parliament, we agreed to the calorific standard, which would determine the heating value of the gas and not the illuminating value. But, unfortunately, we were obliged to keep them both—we were not allowed to drop the illuminating power standard and accept the calorific one. We have led the way in this direction; and I trust that the anticipation of the honourable proprietor will some day be realized, and that the test for luminosity only will be abolished. There is, I think, no doubt that more than 90 per cent. of the gas sent out is used for purposes in which the luminosity of the flame is of no value. With regard to paying off the redemption fund, the sum which has been contributed by this means is now £120,000. The total amount to be paid off is £1,000,000; and the half-yearly contributions will grow as the price of gas comes down. Next year, we shall be paying, not £20,000 a year, but £30,000 a year. We have to day, as we always do, listened with great pleasure to the observations made by Mr. Hounsom; and, speaking as he did of the necessity for sympathy among all classes of those employed in the service as well as outside, he spoke of the days having gone by when the association between employer and employed was close, intimate, and sympathetic. I venture to say that the adoption of the system of co-partnership has done very much to bring back those days, the departure of which Mr. Hounson deplores. First of all, the system of Committees at each of the works and stations of the Company, where the men assemble with their officers to discuss what is best for the Company and best for the advancement of the objects aimed at by co-partnership, and the less frequent meetings of the General Committee in this room, where we all talk over together these same questions, have done very much to bind closer together all those who are striving for the advancement of the interests of the Company. With regard to the observations of the first speaker, I cannot help feeling a little regret that, before painting so alarming a picture, he had not taken the trouble to call at the office in order to verify, if he could, a few of his statements. With regard to capital redemption, we are not aiming at redeeming the whole of the capital of this great Company. No period is attached to the life of the Company. It may go on for all time. The amount which we are seeking to redeem is one million sterling, which, as we stated when before Parliament, is not represented by assets, due to the closing-down of stations. This, as I explained on the last occasion, was in several cases more in the public interest than in the interest of the Company itself. We have a certain amount of capital which is not represented by assets. They have been wiped out; and what we are trying to do by this half-yearly contribution is to bring the amount down, which will effect a large saving in expenditure on capital. The first speaker said the ordinary gas proprietor did not recognize, as he did, the difficulties; but I think the ordinary gas proprietor is more nearly in the right than is the extraordinary shareholder. As to what will happen when our coal supply is exhausted, I think we may, for a few years, possess our souls in patience. With regard to almost every other observation made by the honourable proprietor, I think it is clear to the shareholders that the Company are doing everything that it is expected the Company can do in the direction he pointed out.

The resolution was then put to the meeting, and carried unanimously.

DIVIDENDS.

The SECRETARY read the following minute as to dividends:

(1) That the sum of £10,000 be set aside out of the divisible profits of the Company for the half year ending on the 30th day of June last towards the redemption fund, in accordance with the provisions of the Company's Act of 1903.

(2) That a dividend as follows for such half year be declared—viz.:

On the 4 per cent. consolidated preference stock, at the rate of £4 per cent. per annum.

On the convertible 5 per cent. preference stock, at the rate of £5 per cent. per annum.

On the 3½ per cent. maximum stock, at the rate of £3 10s. per cent. per annum.

On the ordinary stock, at the rate of £4 13s. 4d. per cent. per annum.

Subject to deduction of income-tax.

The GOVERNOR: I beg to propose that resolution.

Mr. ULICK J. BURKE: I have much pleasure in seconding that.

The resolution was carried unanimously.

The GOVERNOR: That concludes the business of the meeting; and I thank you for your attendance.

VOTES OF THANKS.

Mr. R. J. N. NEVILLE said he had been entrusted with what he thought was the most pleasant duty any shareholder could have been entrusted with; and that was to ask the proprietors to signify their heartiest thanks to the Governor and the Board for the splendid report they had presented. He was sure there was not a single proprietor who was not proud of the progress the Company had made under the Governor, and he did not think anyone in the room was more proud than the Governor himself. As one gentleman had said, sympathy was what was wanted; and if they had that sympathy to-day, it was not only because the public believed theirs was a business Board, carrying on a great business, not only in the interests of the shareholders but of the public as well, but it was owing to the action of the Board and to the support they had been able to get from those under them—viz., the officers of the Company and the whole of the staff who had co-operated so loyally in bringing about this result. He hoped the proprietors would give a hearty vote of thanks to the Governor and the Board of Directors for the report, of which any company might well be proud. He had great pleasure in moving the resolution.

Mr. E. KIMBER said he had great pleasure in seconding the motion. No doubt, some of his observations might be thought to be rather too critical on the Board; but that was not his object at all. His object was to support the gas industry. He thought the amount of capital to be redeemed might have been stated in the accounts; but if, as the Governor had said, it was only £1,000,000, the whole case was entirely altered.

The resolution was carried unanimously.

The GOVERNOR: On behalf of my colleagues and myself, I thank you very heartily for this vote. I think I may say that we are proud of the report; and I, personally, am glad to have an opportunity of acknowledging the cordial and sympathetic help and the loyal support which I have always had from my colleagues. With regard to the staff, I cannot speak too strongly; and I propose that our best thanks be given to them, one and all. It is a pleasure to attend all the meetings of this Company. I do not mean these public meetings when the proprietors are so friendly; I mean the meetings of the Court, the Committees, and the inspection of works. On all these occasions it is a pleasure to those who take part in them; and for this I am sure I have to acknowledge very largely the cordial and hearty way in which all the officers have worked together and have infused their spirit into the men working under them.

Mr. JOHN MILES seconded the motion; and it was carried unanimously.

Mr. D. MILNE WATSON (the General Manager): On behalf of my colleagues, myself, and the staff generally, I beg to thank you most cordially for the very hearty vote of thanks you have just passed. The responsibilities of our position are very considerable, and are not lightly undertaken; but so long as we have the confidence of the Directors and the proprietors of the Company, I can assure you we shall do our best. We have just now come to the end of a year of the co-partnership; and I, as one of the 9010 co-partners, can say we thoroughly appreciate what the Board and the shareholders have done for the working men in giving us this co-partnership. I feel sure that in the long run it will spell great success for the Company, and will infuse into all the members of the staff that enthusiasm and zeal which was not perhaps always present. One and all are working for the Company, and everyone feels that everything done tends to the success of the co-partnership which the Directors and shareholders were kind enough to bestow upon them. I thank you most heartily for the very kind vote of thanks you have just passed.

This concluded the proceedings.

Aldershot Gas, Water, and District Lighting Company.—The accounts presented at the half-yearly general meeting of this Company on the 29th ult. showed that the total revenue in the six months ended the 30th of June was £29,576, and the expenditure £21,355; leaving a surplus of £8221. The Directors reported that the business made excellent progress in the period named; sales of gas (exclusive of special contracts and works) having increased more than 10½ per cent. The wet weather during the half year interfered with the demand for water by the War Department; but otherwise the business generally had been very good. The Directors recommended dividends at the rates of £6 1s., £4 11s., and £5 per cent. per annum on the several classes of stock, all less income-tax. The Chairman (Mr. W. T. Robertson) moved the adoption of the report; and the motion was carried unanimously without discussion. In acknowledging a vote of thanks to the Chairman, Directors, and staff, Mr. Robertson made special reference to the General Manager and Secretary (Mr. R. W. Edwards), who, he said, was of the greatest assistance to the Directors. Mr. Edwards briefly acknowledged the compliment on behalf of the members of the staff, and personally thanked the Directors for the ready support they had always given to himself.

BRENTFORD GAS COMPANY.

A Gratifying Report and a Reduction in Price.

The Half-Yearly Ordinary General Meeting of the Company was held last Friday at St. Ermin's Hotel, Caxton Street, Westminster—Mr. ULICK J. BURKE in the chair.

The SECRETARY (Mr. William Mann) read the notice convening the meeting; and the report and accounts were taken as read. The report was to the effect that the statement of accounts for the half year ending June 30 showed the sum of £98,750 available for dividends. The Directors recommended the declaration of dividends, subject to income-tax, at the rate of 5 per cent. per annum on the 5 per cent. preference stock, at the rate of 12½ per cent. per annum on the consolidated stock, and at the rate of 9½ per cent. per annum on the new stock, 1881. It was stated that the business of the half year had again been very satisfactory; the increase in gas sold being 4·19 per cent. over the corresponding half year. Enhanced receipts from tar and ammoniacal liquor were also gratifying features in the account. The total number of consumers is now 87,885, as against 81,733 last year; and the use of stoves, both for heating and cooking, is largely extending. The Directors had much pleasure in announcing their intention to reduce the price of gas by 2d. per 1000 cubic feet, as from Sept. 29. The works at both stations are in efficient order, and will be able to meet any demands for gas required in the immediate future.

The CHAIRMAN, in moving the adoption of the report and accounts, said he regarded his task as being very much lighter than that which had confronted him on some previous occasions. He felt sure that the shareholders would agree with him that the report was a highly gratifying one, and that the accounts disclosed not only a good record of the past half-year's working but (what was exceedingly important) of a vitality that was full of promise of a growing prosperity. If they turned to an examination of the accounts, they would find available for dividend a sum of £98,750, as against £88,960 for the June half of 1909. This meant that, after paying the dividends as recommended on the three stocks—including that on the £30,000 of new stock issued in January last—they would have a surplus of £9638, which, added to the balance from the last account of £48,556, would make a carry-forward of £58,194—being in favour of this half-year's account as against that of the corresponding half year of 1909, by £8498. Well, the shareholders would ask perhaps how this satisfactory result had been arrived at. If they looked, then, into the details of the accounts, they would find an increase in gas, meter, and stove rental of £8181, in breeze of £122, in tar of £1523, and in ammoniacal liquor of £1650, while the only set-off against this good business return was on coke, which was £525 less. This was the epitomized story of the manufacturing returns. On general expenditure, there was perhaps not much to call attention to, except that coals, despite the increase in gas and products sold, had cost £3762 less. In wear and tear, both that in manufacturing and in distribution, there was no doubt an increase, as to which he might have a word to say later on; and the same remark applied to parliamentary charges. He thought he might say that all this made a very welcome record of the Company's affairs, and a record which justified the reduction of 2d. per 1000 cubic feet in the price of gas, which it was hoped to give the consumers the advantage of as from Sept. 29. Now in the item of parliamentary charges there was an increase of something over £400. The shareholders were probably all familiar with the Test Burner Bills which had been struggling through divers courses in Parliament. The Brentford gas was tested by a burner called the "Brentford" burner—a burner which fulfilled all statutory requirements, and which, he might also add, had been recognized as so fulfilling its obligations by the High Court. The "Brentford" burner, so far as the Company were concerned, was all they wanted. It was a very good burner; and therefore the shareholders might wonder why the Directors should have decided to spend money in going to Parliament to get it altered. The Board thought—and they were still of the same opinion—that it was really to the advantage of the gas industry generally, or at all events to the Company's consumers and all the councils which they were so much concerned with, that there should be a recognized uniform burner; otherwise it was very difficult indeed to make comparisons between one company and another. They were quite willing to go and carry a Bill through Parliament, provided it was not opposed, as it was to the advantage of the councils as well as to the Company—in fact, it was rather more to the advantage of the authorities than to the Company. However, several of the councils did not see eye to eye with the Directors, and they proceeded to oppose. This would have meant a long and expensive inquiry; and therefore the Board did not care to fight the matter. They preferred to have their own burner rather than to enter into a costly struggle which might have involved the Company in calorific tests and other things they did not want. The Bills were fought smartly in the Lords Committee first of all, and went through without any restrictions. The second reading was opposed in the Commons, to prevent the Bills being committed. However, they were committed; and, thanks very much to the excellent Committee who considered the measures, they were carried there again without any restrictions. He was sorry to say the third reading stage was not over yet; but he thought there should be very little further opposition. Of course, the Bills did not concern their Company much; but the Directors were anxious to congratulate the other companies who were interested on the masterly grasp of the case by the Chairman of the Committee and the opinions expressed. It was good for the industry. They might sooner or later have to go to Parliament; and he hoped that what had been done would be regarded as a precedent. It was always better for the consumer that the science of gas making and the evolution of its cheaper distribution should not be ampered by undue restrictions and interference of official bodies. He had already remarked that he rather felt his task on this occasion was lighter than heretofore; and this brought him to the question of wear and tear. Three years ago, when he first took the chair, he warned the shareholders that a great deal had to be done—a lot of money had to be spent; and it had been his regret, he believed, on every occasion he had spoken in that room to say that the time of expenditure was still upon them. Probably the proprietors had wondered when it was going to stop. But they had waited patiently, and he thought now they had rather reached the time of their reward. These three years had been a period of most careful watching and strenuous work; and very gladly he gave credit for all this to their Engineer and Manager (Mr. A. A. Johnston) and to the staff generally, by whom the Company were very ably and loyally served. Mr. Johnston had furnished him with a summary of the work done during the last three years; and since it so justified the wisdom of the policy pursued by the Board, he would briefly refer to some of the leading points in this report. Mr. Johnston said that at the time of his appointment the capacity of the producing plant—coal gas and carburetted water gas—was, Southall 7,350,000 cubic feet per day, Brentford 3,600,000 cubic feet—making a total of 10,950,000 cubic feet per day. The maximum day's output at the time reached 11,087,000 cubic feet. By improved working, re-construction, and additions during the past three years, the capacity had been substantially increased; and excluding the horizontals at Southall, it was now approximately as follows: Southall, 10,300,000 cubic feet per day; Brentford, 5,100,000 cubic feet—making a total of 15,400,000 cubic feet per day. In bringing about this result, the only item charged to capital account was the sum of £5088 for the new carburetted water-gas plant at Brentford; and they had now sufficient producing plant to meet all likely requirements for some years to come—the maximum demand last year having been 12,215,000 cubic feet. Coal and coke handling plant was being installed at Southall; and new boilers had been provided at both Brentford and Southall, as well as new exhausters, condensers, tar-extractors, and station meters. With reference to distribution matters, Mr. Johnston pointed out that important developments had taken place with regard to the dealings with consumers. New show-rooms had been opened at Twickenham, Ealing, and Brentford, and depôts provided for the outdoor staff at Hanwell, Hounslow, and Twickenham, from which a saving of valuable time would result. Maintenance of consumers' burners had been undertaken, and a general fittings business established. "That the innovation," proceeded Mr. Johnston, "is appreciated by your consumers is, I think, conclusively proved by the improved lighting in your district, and the readiness with which the public avail themselves of our services." This record was not only gratifying to the Directors and shareholders, but was one of which the Manager and staff might justly feel proud. He hoped that all this expensive work was now practically completed, and that the reduction in price promised in the report would prove but an earnest of future similar concessions. He was not going to prophecy further reductions; but he thought they would be very likely to come about. Reduction in price was, and must be, a leading feature in the policy of every gas company; but he must not be taken to promise a period of too thrifty expenditure. Gas invention in all its branches was never still, and it ever behoved them to take all advantage of it, and to live up to the times. Even now, he might say, the Board had several big jobs under consideration. For instance, there was the dock at Southall. Then, again, high-pressure gas was coming more and more to the front; and they could not afford to neglect its advantages. It was extremely probable, therefore, that they would have to lay down a high-pressure main in part of their district. This would be, he should think, a capital charge, and thus it would not affect the revenue.

Mr. R. J. NEVILLE NEVILLE seconded the motion.

Mr. PFÜNGST asked how it was there was an increase of nearly 18 per cent. in salaries and wages of officers under the heading of distribution. He also thought the £199 interest allowed by bankers, as shown in the profit and loss account, was rather small, in view of the large average amount of money that the Company must have on deposit over the half year. As to the investments, he suggested that the market value of these should be taken once a year—at the date of the balance-sheet—instead of putting them in at cost. So far as he could make out, the £43,000 invested only produced interest to the extent of £565, which worked out at 2⅝ per cent.

The CHAIRMAN replied that the question of bankers' interest did receive the careful attention of the Board; but it had to be remembered that their bankers were very good in meeting them in the matter of overdrafts when necessary. The question of distribution salaries and wages was dealt with by Mr. Johnston in the report he had already referred to, as follows: "Under the heading of distribution charges, salaries and wages have grown from £10,745 to £18,912. This is partly due to the fact that the automatic work formerly done by contractors has been undertaken by our own workmen, whose wages are included in this account instead of under wear and tear, as they would have been had the work been done by contractors. The addition attributable to this cause would be approximately £3000." This was on the year. The valuation of the securities was a point which had engaged their attention, as it had done that of the directors of many other companies. Securities did go down; and he supposed there should really be a system of writing-off. However, he was reminded that some of the securities they had bought would be paid off at par at certain dates. As to the interest return, of course they were limited in regard to the kind of securities which they could purchase.

The resolution was then carried.

On the proposition of the CHAIRMAN, seconded by Mr. NEVILLE, the dividends recommended in the report were agreed to.

Mr. THOMAS WILKINS proposed, Mr. HATCHWELL seconded, and the shareholders heartily passed, a vote of thanks to the Chairman and Directors.

The CHAIRMAN, when acknowledging it, suggested that a similar compliment was merited by the officials, to whom the Company were greatly indebted. Their zeal and attention to the work was beyond all praise.

Mr. NEVILLE seconded the vote, which was promptly carried.

Mr. JOHNSTON, in reply, said that he had had a great deal of hard work; but it had been a labour of love. He owed much to his staff, for the loyal assistance he had received from them.

Increased Water Storage for Shanklin.—The Shanklin District Council accepted last Tuesday a tender from Messrs. Streeter and Co. for the construction of a high-level reservoir at Chillerton. There were four tenders, and the lowest, for £1339 19s. 4d., was accepted; the highest being for £1489.

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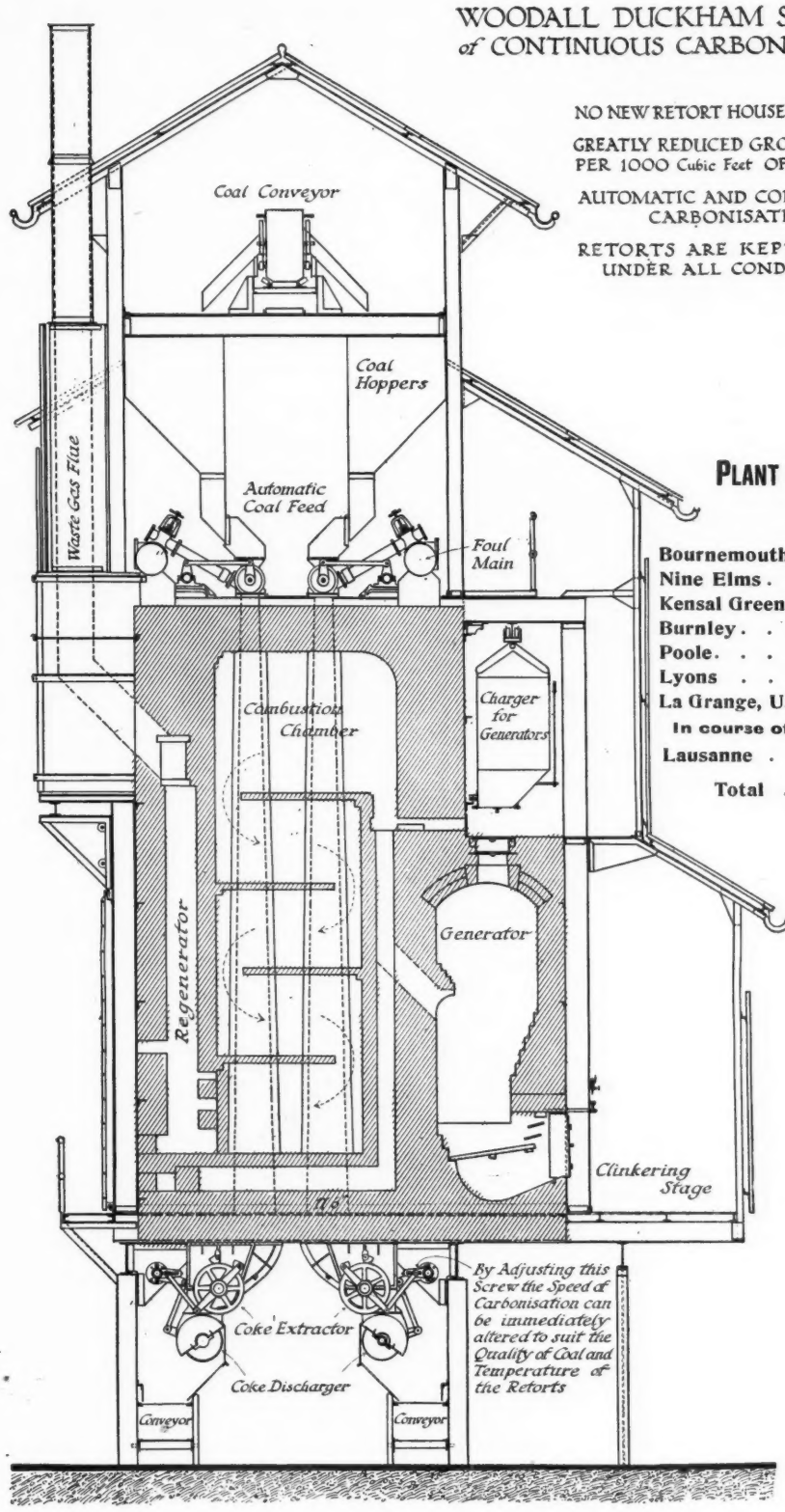

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Burnley	1,125,000
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Lyons	125,000
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Lausanne	1,500,000
Total	4,700,000

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New Type of "GRAETZIN" Street Lamps.

125-C.P. per Burner.

All Regulating Parts at top of Lamp and covered with a Removable Cap.

Consume about 4-cubic feet per Burner per Hour.

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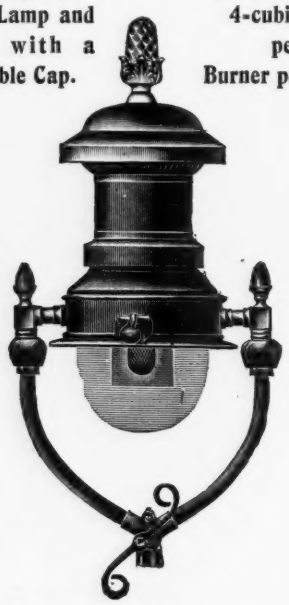

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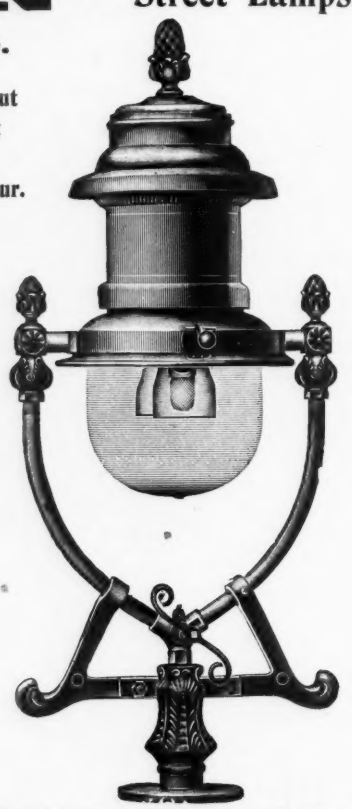

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SOUTH SUBURBAN GAS COMPANY.

The Half-Yearly Meeting of the Company was held last Friday at De Keyser's Royal Hotel, Victoria Embankment, E.C.—Mr. CHARLES HUNT in the chair.

The SECRETARY (Mr. Charles M. Ohren) read the notice convening the meeting; and the report and accounts were taken as read.

CONSUMPTION AND METEOROLOGICAL CONDITIONS.

The CHAIRMAN, in moving the adoption of the report and accounts, said the Board were very glad to have this recurring opportunity of giving an account of their stewardship, especially when, as on the present occasion, the tale they had to tell was one of progress, almost all along the line. Six months ago, however, they were rejoicing in a substantial increase in the consumption of gas; but that day the figures exhibited a slight falling off, under circumstances which were entirely beyond their control, and showed how greatly gas consumption was affected by the weather, as a natural consequence of its extended use for heating purposes. During the first three months of the year, and particularly in February and March, the weather was comparatively mild; and the consumption of gas was adversely affected. Immediately, however, the temperature dropped below that of last year, the consumption picked up; and for the last three months of the half year, it presented a satisfactory increase, although not sufficiently large to counterbalance the earlier deficiency. Though an increase of consumption was always more acceptable than a decrease, it was satisfactory to know that the number of consumers had increased, and that there was no falling off in the demand for gas-heating appliances suitable to the season; for large numbers of additional cookers, hot-water circulators, and other similar appliances were fixed during the half year. This, as a matter of course, was being done with the object of increasing the consumption of gas; but it might also be claimed that, in thus seeking to extend their business, the Company—and gas undertakings generally—were performing an important public service, the value of which was recently acknowledged by the President of the Local Government Board, the Right Hon. John Burns, M.P. Replying to a deputation who waited on him with reference to smoke abatement, Mr. Burns drew attention to the work of the gas companies in promoting the use of gas-heating appliances, and was reported to have expressed the opinion that "the use of all this additional gas in lieu of coal must undoubtedly have reduced considerably the smoke nuisance in London." It was indeed beyond question that the purity of the atmosphere of London had been greatly improved by the extended use of gas for heating purposes; and the thanks of the gas industry were due to Mr. Burns for having drawn public attention to the fact. Shareholders might justly plume themselves upon their participation in this good work; and he hoped that their dividends would not be the less acceptable in consequence.

HIGH-POWER GAS LIGHTING AND ELECTRICAL FICTION.

As mentioned in the report, a further stimulus to gas consumption had recently been supplied by an adaptation of the inverted incandescent burner to high-power lamps, by which was meant lamps of from 200 to 500 and 1000 candle power. A considerable number of these lamps were fixed by the Company during the half year for outside shop and other lighting, and were giving great satisfaction. There appeared to be a large field for the employment of such lamps; and the officials might be relied on to cultivate this to the utmost. And here he should like to express the Board's appreciation of the excellent service which was being rendered by the Chief Inspector (Mr. Baldry) and the staff and employees with him in the Sales Department, who, under the direction of Mr. Shoubridge, were doing their best to promote the Company's interests in this department. Results of their work showed that, although it was not in the Company to command consumption, the very utmost was being done to deserve it. He might refer in this connection to a full-page advertisement which recently appeared in most of the newspapers, and was followed by a prospectus of which the proprietors had probably seen something, announcing the final triumph of electricity over gas, which, according to it, had no longer a chance of existence unless supplied at 7½d. per 1000 cubic feet. Why the odd half-penny was not quite clear; but perhaps they ought to be grateful for it. He might say, however, that the Board were not greatly perturbed by the prospect thus held out to gas undertakers, nor would it be worth while to take notice of it, were it not for the opportunity it afforded of placing before consumers that which was a true statement of the case. The only foundation for the statement in question appeared to be the further one that a "brilliant" light could be maintained for forty hours by electricity at the cost of a penny. The candle power of this so-called "brilliant" light was not stated, though obviously this was the *crux* of the whole matter as regarded comparison of cost. Giving, however, to the amount of electricity used at 3d. per unit, the exceptionally high efficiency claimed for it—viz., 1 watt per candle power—this could not be more than 8 candles; whereas the present price of this Company's gas (2s. 5d. per 1000 cubic feet) was equivalent to the maintenance with inverted burners of a light of fully 20 candles for the same number of hours, and at the same cost. So far, therefore, from gas being reduced to the necessity of eking out a scanty pittance of a few pence per 1000 cubic feet, it was actually, at its present price, two-and-a-half times cheaper than electricity at its very highest efficiency; and even if charged for at the high price of 6s. per 1000 cubic feet would still be as cheap—light for light—as such electricity at the very low price of 3d. per unit. Nor did the advantage of gas over electricity end here, for the cost of maintenance had to be considered. This could not be less than three or four times as much for electricity as for gas, because electric lamps at about 3s. each did not last many more hours than incandescent gas-mantles at 4d. or 6d. each. These figures related to gas supplied under ordinary pressures for domestic and other similar lighting. For street and other lighting where high pressure could be employed, the candle power might be doubled; so that high-pressure gas, which was now coming to the front, if supplied at 12s. per 1000 cubic feet, would be as cheap—light for light—as electricity at its very best, and supplied at the unusually low price of 3d. per unit.

CARBONIZATION AND RESIDUALS RETURNS.

Turning now to a more congenial task, the accounts which were before the proprietors revealed, he ventured to say, the strength and solidity of the business of a gas undertaking. They showed that the deficiency in revenue caused by the reduction of price which was made last year, and, in a lesser degree, by a slight falling off in consumption, had been more than made up by improved working and better prices for residuals; and that, in addition, they had been able to meet exceptionally heavy expenditure on repairs and maintenance, due to the necessity for replacing and modernizing certain retort-house and other machinery. As the result of this expenditure, the works would shortly—for the work was not quite finished—be better equipped than ever for the economical production of gas. The fruits of the Board's policy in this direction, acting on the advice of their able Engineer, Mr. Shoubridge, were already apparent in the increased production of gas per ton of coal carbonized; this having now reached the high average for the half year of nearly 11,700 cubic feet, or 370 cubic feet per ton more than for the same period of last year, representing a saving of 1939 tons of coal. He (the Chairman) need not point out how great an advance this production was upon the old and almost stereotyped returns of 10,000 cubic feet per ton; the fact being that freedom from the shackles of high and, under modern conditions, wasteful illuminating power—for which freedom the gas industry was primarily indebted to the prescience of the Company's late Chairman, Sir George Livesey—had made possible improvements in carbonizing methods which otherwise could not have been attempted, and with the happiest results to all concerned. The old saying that dividends were made in the retort-house still held good, in the sense that it was mainly there that the possibility of saving in working costs existed; and the great amount of attention which was being directed to the subject of carbonization at the present time bid fair to result in a further cheapening of carbonizing costs which, in the case of this Company, were already among the lowest in the kingdom. The return for residuals showed a substantial increase for both coke and sulphate of ammonia. Residuals, as the proprietors were aware, formed a most important source of the revenue of a gas undertaking; and when these were doing well as to prices, it was safe to say there was not much amiss with the general trade of the country. There was a substantial improvement in the return for sulphate of ammonia which was partly due to higher prices, but chiefly to a larger yield of ammonia per ton of coal carbonized. Coke had fetched about £2000 more, although less was made for sale owing to the smaller quantity of coal carbonized. There had been a falling off in the yield of tar; but values had kept up, and were improving, owing mainly to a continuance of the demand for pitch, which was its most bulky constituent. In addition, however, there was a very fair and increasing demand for tar for road-making purposes, which already, it was estimated, absorbed 10 per cent. of the total gas-works production.

HIGHER COAL PRICES.

After payment of dividends at the same rates as those of last half year, the amount carried forward would be increased by about £1200. This increase would add strength to the position in the event of their being less favourably situated next half year, which was possible, seeing that they had been greatly helped in the accounts under consideration by the reduction in the price of coal obtained last year, and that this had now come to an end, and an advance in price had had to be submitted to. For this advance there did not appear to be any justification in the general condition of the coal trade; and it might be regarded as a direct outcome of the operation of the Mines Regulation (Eight Hours) Act, which was ushered in by considerable disturbances in the mining districts. These had, however, now settled down; and there was no present reason why coal prices should not follow suit.

THE WORKERS' BONUS.

Full provision had been made in the accounts for the payment of the bonus to the employees which was due under the provisions of the co-partnership scheme. This, at 6½ per cent., amounted in the aggregate to the largest sum ever paid by the Company since the formation of the scheme—a result which might be regarded as most satisfactory, because the holdings of the employees in the Company's stock would thereby be substantially increased. The gradual increase of these holdings was a chief cause of the success of the scheme, since the larger his stake in the Company, the greater must be the interest of the employee in its success. Co-operation was thereby increasingly promoted; and, as stated in the report, it was largely to this co-operation that the Board attributed the continued success of the undertaking. He might say that the average holding of stock by co-partners was now £50, and that there were now 39 who held £100 and upwards. While on the subject of co-partnership, with which Sir George Livesey's name was inseparably connected, he might mention that the Livesey Memorial Professorship at Leeds University had now been definitely established by the handing over to the University Authorities of the amount subscribed, which was between £10,000 and £11,000, on terms which had been approved by the subscribers, of whom the Company were one, and that a thoroughly representative Advisory Committee had been formed to secure the due administration of the fund.

THE STANDARD BURNER BILLS.

This concluded all that it might be necessary for him to say upon the report and accounts; but he should like to refer to a recent event of considerable interest and importance to all gas shareholders—viz., the passage, so far, of the Gas Companies' Standard (Burner) Bills, in which a member of the Board—Mr. Charles Carpenter—took a leading part. These Bills were, as the proprietors probably knew, promoted jointly by some forty or fifty gas companies, with the object of extending to them the use of the test-burner known as the "Metropolitan" No. 2. This burner was accepted some years ago by the Gas Referees for the testing of London gas, and had since been extensively adopted by gas undertakings—this Company among the number—under the authority of Parliament. It gave a fairer value to the gas than could be obtained by the old test-burners, and, what was of the utmost importance, was entirely free from the depreciating effects upon gas having a lower quality than 16 or 17 candles, which was a most serious defect in the No. 1 "London" argand. It was, in fact, admitted on all sides to be the most accurate scientific instrument for gas testing. It was the invention

of Mr. Carpenter, who devised it as complying with the provision in the London Gas Act, 1905, that the burner used for testing should be such as would develop the greatest amount of light from the gas, and be suitable for use by the consumer. The effect of this combined action on the part of the companies was to bring into the field against them all the forces of reaction, so that the result was all the more conclusive on the side of progress. He might mention that the second reading of the Bills in the House of Commons was strongly supported by, among others, their friend Sir Fortescue Flannery, who made, if he (the Chairman) might be allowed to say so, a very convincing speech in favour of it. Mr. Carpenter was the principal witness for the Bills; and it was not too much to say that he bore the brunt of the long conflict in Committees, and that, as the bone of contention was his burner, so also was the victory his. He (the Chairman) was sure they all congratulated him very heartily upon it, and for having so successfully sustained the fortunes of the industry. Further opposition to the Bills was threatened on their reaching the final stage in the House of Commons; but it could hardly be supposed that Parliament would reverse the decision of the Committees of both Houses.

Mr. ROBERT MORTON, in seconding, said he was sure the proprietors had listened, as he had done, with very great interest to the lucid explanation of their Chairman of the affairs of the Company.

The motion was unanimously carried.

The DEPUTY-CHAIRMAN (Mr. Jabez Light) moved the declaration of a dividend for the half year of 5 per cent. on the preference stock, and of 5⅜ per cent. on the ordinary stock, less income-tax. He remarked that everything was in a gratifying condition. As one paragraph in the report stated, there had been an increase in the number of consumers in the half year, and a continuance in the demand for domestic gas-heating appliances, suitable to the season; while improved high-power lamps, fitted with inverted incandescent burners, were finding favour for outside shop and other lighting.

Mr. GEORGE ROSS (one of the Workmen-Directors) said it gave him great pleasure to second the resolution, especially as the employees of the Company participated in the profits. They were all indeed grateful for the late Sir George Livesey's system of co-partnership, and for the privileges it conferred.

The motion was unanimously adopted.

Dr. SIDNEY TURNER, in moving a vote of thanks to the Chairman and Directors, remarked that the Chairman had told them that, at the beginning of the year, the amount of gas consumed fell off; but, during the last three months it had increased, so that the average had only receded from the corresponding period of last year by less than 1 per cent. He was glad to hear this, because they had all noticed the character of the weather; and, as proprietors in a gas company, they had something to thank the weather for, seeing that, had it not been bad, the extra consumption would not have taken place. Having referred to the evidences of good management on the part of the Board, and to the excellence of the manufacturing returns obtained by Mr. Shoubridge, he turned attention to the question of smoke abatement, and said there was no doubt whatever that in the future the people of this generation would be looked upon as barbarians for using coal in the way they did. There was no question, in his opinion, that the time would come when gas heating would take the place of coal-fires; and then they would hardly know London. It would be an immense benefit to all to have purer air to breathe, and to have stopped the destruction of property resulting from smoke and sulphurous fumes. He noticed that the sale of residual products had increased very much; and he believed the increase would go on, seeing that the motor traffic had caused such a large demand for tarmac roads. He also alluded to the lowness of the item of unaccounted-for gas.

Mr. W. WARTH seconded the motion, which was heartily passed.

The CHAIRMAN, in responding on behalf of himself and the Board, said he hoped the proprietors would take to heart Dr. Turner's observations as to gas heating, and encourage the use of gas for this purpose as much as possible. Regarding the item of unaccounted-for gas, if they took (as they ought to take) the two past half years together, they arrived at the moderate figure of 3½ per cent. Proceeding, he said the efforts of the Directors would be of little avail if they were not supported—and cordially and zealously supported—by their officers and employees. It was his privilege as Chairman to propose a hearty vote of thanks to the officers, from Mr. Shoubridge and Mr. Ohren downwards to all the employees, for their devoted attention to the affairs of the Company.

Mr. T. GUYATT seconded the motion, which was supported by Mr. FRANK BUSH, who remarked that such a satisfactory balance-sheet could not have been presented had it not been for the officers. The Chairman had alluded to the fact that the co-partners had been paid 6½ per cent. He hoped that was an amount that would go on increasing. There was a splendid odour there of *esprit de corps*. It was a great pleasure to see so many workmen-proprietors present, and the two Workmen-Directors on the Board. That they were intelligent members of the Board he felt quite sure. Under all the circumstances, he was certain the success of the Company was assured.

The motion was cordially adopted.

Mr. S. Y. SHOUBRIDGE, on behalf of the engineering staff and the workmen, thanked the proprietors very heartily for their expression of generous appreciation of their services. The Board were at all times good to them, and supported and encouraged them in all they did—not only by means of the co-partnership scheme, but by the superannuation scheme, and in every possible way. At the present time, they were building an excellent recreation room for the co-partners; and in every manner there was encouragement to them individually and collectively to do their very best. They would be ungrateful indeed if they did not do everything possible for those who were so kind to them. He should like to take the opportunity of expressing his great indebtedness to Mr. Waller and Mr. Ross, the two representatives of the workmen on the Board, who had helped him wonderfully, and relieved him of a very great deal of anxiety. Their example and strenuous efforts on behalf of the Company had a notable effect on the whole of the employees; and he was sure a great deal of the success of the Company was due to their good example.

Mr. OHREN, on behalf of himself and staff, also expressed his sincere thanks for the vote and the kind remarks that had been made.

TOTTENHAM AND EDMONTON GAS COMPANY.

The Ordinary General Meeting of the Company was held last Saturday, at the Works, Willoughby Lane, Tottenham—Mr. CORBET WOODALL in the chair.

The SECRETARY (Mr. E. Topley) read the notice calling the meeting; and the report and accounts were taken as read.

The CHAIRMAN, in moving their adoption, said the report and accounts were so satisfactory that he thought he would be well advised if he adopted the old proverb that "Good wine needs no bush," and leave them to speak for themselves. It might be his fortune to preside at a few more meetings of the Company; but he could hardly hope that he would ever be able to place a better record before the proprietors than he was doing on this occasion. They were a co-operative institution now—a tripartite alliance of consumers, shareholders, and workers, all interested in, and profiting by, the success of the Company. And he believed that the idea—the spirit of the idea—had taken full possession of them all, and to this was due, in some large measure, the success that had attended, and was attending, their operations.

CAPITAL AND INTEREST AND DIVIDEND.

They had in the past half year added £6374 to their expended capital. But in the same time the capital in proportion to the business done was still further reduced; and it was now at the lowest amount at which it had ever been in the history of the Company. It now stood at £431 per million cubic feet of gas sold. In an analysis of the cost of gas making and distribution, the charge for dividend and interest took an important place. A comparison with ten years ago showed that then the capital was £526 per million cubic feet; and the charge for interest and dividend was 8·75d. Now the same items were respectively £431 and 6·2d.; so that, while they had been increasing the amount of their dividend to the extent of about 16 per cent. in the ten years, they had at the same time reduced the charge as against revenue and against the consumers in the way described. The proprietors had, or would have, in inspecting the gas-works, an illustration of the necessity for watching carefully this question of capital expenditure. Gasholder No. 2, which was built in 1868, and which stood by the workshops, was being demolished, because the site would be of more use than the gasholder, which was too small and too light to be of further good service. This holder figured in their accounts at a value of £6000. They had written off in the past half-year's accounts £1000 of this amount, and commenced the formation of a redemption fund, to which they had carried £3000, towards providing for the balance of the £6000, and also for similar cases in future. The redemption fund was granted to the Company when in Parliament in 1906; but they had never yet taken advantage of it. Ordinary repairs and renewals were dealt with from year to year in the revenue account; but when they came to items like the one to which he had been referring, they were so large that it was impossible to provide for them in the current half year. So the fund was formed as a suspense account, in order to make provision in advance for such requirements as they arose. He need hardly point out to the proprietors the absolute necessity, if the undertaking was to be maintained in a healthy condition, of there being no risk of leaving in the capital account money represented by plant dismantled and abolished.

SOME RECORD ITEMS.

With regard to the revenue items, they were all of them favourable; and a few more records had certainly been established. The quantity of gas sold per ton of coal carbonized was more by something like 420 cubic feet than it had ever been before in the history of the Company. The carbonizing wages had been reduced to 1·5d. per 1000 cubic feet of gas sold, which was also the lowest amount hitherto reached. He desired to avoid the possibility of a mistake in this matter. The saving in wages was due, in considerable measure, to the adoption of machinery on the works. Of the labour reduced in the retort-house, some portion was transferred to the works of the manufacturers of the machines, and another portion was transferred to their own shops where the machines were repaired and renewed. The number of men employed by the Company was not reduced, but was steadily increasing. As the price of gas was lowered by the economies to which he was referring, so the demand for it increased; and a larger quantity of gas had to be made. So they had an advance in the number of men employed. He might say the character of the work grew less exhausting year by year; the atmosphere and surroundings in which it was carried on improved; and the average rate of pay to workers was also enhanced.

OTHER SAVINGS AND IMPROVEMENTS.

With regard to the cost of materials, it had been less than in the corresponding period of 1909 by £2082, while residuals had yielded a revenue £2579 greater. Another item in which there had been some saving effected had been in public lighting, through the automatic lighting and extinguishing of the street lamps, in the introduction of which system their Engineer (Mr. Broadberry) had long taken a leading part. The system had worked well, and had resulted in a saving of about £1500 per annum, which had inured to the advantage of both the Company and the lighting authorities.

FINAL RESULT, AND A PROJECTED REDUCTION.

After meeting all preference charges, and carrying £3000 to the redemption fund, and adding £1000 to the insurance fund, there remained £18,638 to add to the carry-forward of £20,682 from the previous accounts; so that they had £39,320 available for dividend. The Directors, as usual, recommended that the full amounts to which the proprietors were entitled be divided; and, if this was approved, they would have a balance to carry forward of £23,154. The accumulated funds of the Company now amounted to £62,118—another record—and a further reduction in the price of gas would be made at the end of the present year. Rejoice, co-partners! [Laughter, and "Hear, hear."] The market value of investments, representing the reserve and insurance funds, had fallen below the price at which they were purchased, and at which they had stood in the Company's books; and the difference would probably be made good in the current half year. They had already written-down these investments; and he was disposed to

say, "Happy are the companies who have their reserve funds in their own hands, and employed in their own works."

POPULARITY OF THE COMPANY'S STOCKS.

On March 1 last, £30,000 of the Company's stock was offered for sale by tender; and it was applied for three times over. Above £27,000 of it was allotted to present proprietors and to consumers in the Company's area of supply—the average price realized being £112 9s. 1d.

ELECTRICAL COMPETITION.

Since he came down to Tottenham that morning, he had been told they were to have a little more strenuous electrical competition in a part of their district. The North Metropolitan Electric Supply Company had taken over the Provisional Order of one of the urban districts; so that he had no doubt some vigorous effort would be made to capture some of the business in possession of which the Gas Company now rejoiced. They were, however, doing their best to make the merits of gas known in its various applications. They were just opening some new premises. Land had been bought at Southgate; and upon it they were going to build a local depôt and district office. A new showroom would also be opened there; and he had no doubt whatever the Company would be able to hold their own pretty efficiently in the competition they had to face.

Mr. HENRY BAILEY seconded the motion, which was unanimously carried.

The DEPUTY CHAIRMAN (Sir Daniel F. Goddard, M.P.) proposed the declaration of the full statutory dividends at the rates of 7 per cent. per annum on the "A" stock and 5¼ per cent. per annum on the "B" stock. He remarked that this was the full amount of dividend they were allowed by law to pay, though the profits and working were good enough to pay more. Some people were inclined to criticize gas companies when dividends were increased; but it should be remembered that nowadays they could not increase dividends without enormously increasing the benefits to those who consumed gas. The Chairman had alluded to the fact that the amount of the dividends had increased about 16 per cent. during the past ten years; but the advantages to the consumers far out-balanced this. Putting the matter another way, the increase of dividend the proprietors obtained on this occasion amounted to about £352 for the half year, while the consumers received £3200 in the reduction of the price. These two figures ought always to be taken together, lest people imagined they were piling up dividends without giving a relative, or more than relative, advantage to those who consumed gas. One other remark. The report showed an increase in sales of gas of something like 5½ per cent. over the sales of the corresponding half of last year. He would like to utter a warning against accepting too strongly the law of percentages. The law of percentages was in this instance a most dangerous and misleading one. The increase at the rate of 5½ per cent. was much less than the increase in the corresponding half of last year. But it was an increase on an increase; and it tended to make the percentage lower than before. He believed the increase in the half year in the amount of gas sold was about 39 million cubic feet. Now supposing they did not diminish one little bit in the increased quantity of gas sold—advancing again by 39 millions, the percentage figure would not be 5½, but only 5¼. It might be then said the rate of increase was going down, and that they were not doing so well. But they were doing just as well. It was on this ground that he asked them not to accept the principle of percentages too strictly as representing the expansion of business.

Mr. JAMES CLOUDSLEY seconded the proposition, which was unanimously carried.

On the motion of the CHAIRMAN, seconded by Mr. JAMES RANDALL, Mr. Bailey was re-elected to the Board, as was also Mr. G. T. Watson, on the proposal of the CHAIRMAN, seconded by Mr. J. EVE.

Mr. BAILEY having responded on behalf of himself and Mr. Watson,

Mr. Chapman was re-appointed as an Auditor, on the motion of Mr. A. W. OKE, seconded by Dr. SCOTT.

Mr. CHAPMAN, in acknowledging his re-election, spoke of the indebtedness of Mr. Edward Crowne (his fellow Auditor) and himself to Mr. Topley for the clear way in which the accounts of the Company were kept.

Mr. H. D. ELLIS moved a vote of thanks to the Chairman and Directors; and, in the course of his remarks, he said the Company were indeed in a most enviable position. It was extremely satisfactory to know that the capital account was now down to £431 per million cubic feet of gas sold. A few years ago, even their Chairman might have thought it would be long—perhaps never—before they got the capital reduced to this point. The amount required for dividend was also very low; and the make of gas per ton of coal carbonized was likewise enviable. And as to the unaccounted-for gas, he did not think it quite touched 3 per cent. Nothing but delightful reflections were aroused by the accounts; and therefore they might heartily congratulate their Chairman and the Directors.

Mr. W. BROWN, in seconding, referred to the question of electrical competition; remarking that he could say from personal experience that electricity was not cheaper than gas for motive power. It might be quicker in starting-up; but he had always found that gas was very much cheaper.

The motion was heartily agreed to.

The CHAIRMAN, in his reply, said the Board were well satisfied with the progress the Company were making; and he thought he might claim that their works were an example to companies of their size in almost any place. Of the central office, their district offices, and, in fact, of all their property, they were proud, and satisfied they had good worth for the money spent upon them. Throughout the entire undertaking, there had been an utter absence of anything like starvation or even skimping; and it could be said that the whole property was in perfect and complete order. He had said that he felt very much the success that had attended the work recently had been due to the admirable spirit prevailing throughout the undertaking. He therefore desired to propose that their best thanks be given to Mr. Broadberry, Mr. Topley, and all the staff and workers of the undertaking. It was pleasant to hear Mr. Chapman's testimony as to the way the work of the office was done; and he (the Chairman) could testify as to the way the work of the Engineer was carried on.

Mr. CHAPMAN, in seconding, said the results of their working were extraordinary—make of gas per ton of coal carbonized, and production of sulphate of ammonia, tar, and coke. He was afraid that the time would come when there would not be the possibility of improvement, unless something remarkable happened.

The motion was cordially passed.

Mr. BROADBERRY, in responding on behalf of himself, his staff, and men, said that since he entered the Company's service (more than 31 years ago) as an apprentice, right down to the present time, his work had been absolutely a pleasure. He could not, in fact, conceive any more pleasant conditions of working than to be associated with their Chairman, the other Directors, Mr. Topley, Mr. Fisher (his chief Assistant), and his staff down to the lowest of the workmen. They were one and all working hard for one end—the true prosperity of the Company.

Mr. TOPLEY associated himself with all Mr. Broadberry had said; adding that it was a pleasant thing to him and his staff to hear the testimony of such an experienced man as Mr. Chapman regarding the efficiency with which their work was done.

[An inspection of the works by the proprietors followed.]

NEWPORT (MON.) GAS COMPANY.

The Half-Yearly General Meeting of this Company was held last Wednesday. Mr. T. G. CARTWRIGHT presided, owing to the absence, on account of ill-health, of the Chairman and Deputy-Chairman (Dr. H. M. Brewer and Sir Thomas Firbank, D.L.).

The SECRETARY (Mr. T. Hazell) having read the notice convening the meeting, the report of the Directors for the six months ended the 30th of June, with the accounts for this period, was presented. The latter showed a balance of £8302 on the half-year's working, and a sum of £9913 available for distribution; and the Directors recommended the payment of the statutory dividend. The Engineer and General Manager (Mr. Thomas Canning) reported that the works were in a state of efficient repair and in highly satisfactory working order.

The CHAIRMAN, in moving the adoption of the report, said the Company had not progressed very much in the period covered by it. In regard to the capital account, the shareholders would remember that the Directors offered for subscription £16,000 of consolidated stock; and it was all taken up at satisfactory prices. This, he thought, showed how well the Company's stock stood with investors. Passing on to the revenue account, he said he was sorry there had been one or two slight drawbacks. One thing was that it was not exactly gas weather—not foggy and cold; and another was the unfortunate labour dispute at the docks. But he was glad to see there was a general movement by capital and labour to submit these disputes to arbitration, instead of having strikes and lock-outs. Then they had been unable to get any relief in the price of coal; but with Eight Hours Bills and expenses going up in every direction, it was difficult for colliery proprietors to make a reduction in prices. The Company had had better results from their residuals; and the price of gas had been maintained. There had been a decrease in the public lighting; but this was entirely due to the action of the Electric Lighting Committee of the Corporation in taking away from the Company 200 lamps. They looked at it from a ratepayers' point of view, and maintained that the ratepayers should light the town with the cheapest form of illuminant, which the Company said was gas. The net result of the half-year's working was that they were able to pay the interest on their debentures and consolidated stock, and carry forward an amount next year, without having recourse to their reserve fund. This was satisfactory, especially as they had been obliged to write off £939 from the value of their Consols; this being the difference in the price at which they bought them and that at which they stood now. The general business of the Company was satisfactory; and they were well served by their efficient staff.

Mr. C. D. PHILLIPS seconded the motion; and it was carried unanimously.

The dividend recommended was then declared; the retiring Directors and Auditor were re-elected; and a cordial vote of thanks was passed to the Directors and officials.

The CHAIRMAN having acknowledged the vote on behalf of the Directors,

The SECRETARY replied for the officials. He said he thought it satisfactory that while the public funds had been going down in value the Company's were going up. The Company's additional consumers in the last three years numbered 1472.

The ENGINEER, in returning thanks, mentioned the advance made in the lighting qualities of gas; stating that now a consumer could get as much light from one cubic foot of gas as used to be obtained from 4 or 5 cubic feet. Consumers had profited very much by the newest inventions in gas. Speaking generally, gas lighting held 90 per cent. of the public and private lighting in the kingdom.

Increase of Assessments in South London.—Readers of the "JOURNAL" may remember that just before the rising of the Courts for the Long Vacation judgment was given in a case bearing upon the assessment of licensed public-houses. The effect of the decision has been that the aggregate assessment of these houses in the borough of Camberwell has been reduced by £15,000 in the provisional valuation list just completed. As a result, the "South London Press" states, the next half-year's demand on ratepayer will, it is feared, show an increase of 3d. in the pound. The Assessment Committee have raised the assessment of the South Metropolitan Gas Company's premises by £11,000. This appreciation of value does not take effect until the Lady Day quarter; and even then the extra burden on the ordinary ratepayer will be 1d. in the pound. Assuming that similar reductions take place in the other South London boroughs, there will be an increase in the rate in Lambeth of 1½d., in Bermondsey of 1¼d., and in Southwark of 1¾d.

CHESTER UNITED GAS COMPANY.

The Ordinary General Meeting of this Company was held last Wednesday—Mr. J. G. FROST in the chair.

The Directors, in their report for the half year ended the 30th of June, stated that the balance to the credit of the profit and loss account, after providing for interest on the debenture stock and dividend on the preference stock, was £5325; and they recommended the declaration of an interim dividend on the ordinary stock at the rate of 2½ per cent. for the half year.

The CHAIRMAN, in moving the adoption of the report and accounts, said the balance of profit was very much the same as last year. They had already appropriated £1000 to alterations of the purifiers. This work was in hand, and was going on satisfactorily. Coal and wages were rather more than last year. There was an increase in the cost of coal, accounted for by the difficulty experienced with the quality supplied; and the wages were higher, owing to the fact that some of the furnaces in the retort-houses had required renewing. These points had received the Directors' constant attention. They had the necessary repairs in hand. The coal purchased for the current year had been of a better quality—in fact, now they were obtaining results equal to those of former years. The sale of gas was something less than last year; but at the same time they had 198 more consumers and 156 more stoves connected. The diminution was principally attributable to a smaller average consumption the early part of the year; and he feared this arose largely from the quiet trade of the city at the time, though it was partly due to the continually increasing use of incandescent gas-burners, which recently had achieved most remarkable economies. Indeed, considering that with a modern incandescent burner a brilliant light could be obtained for seven to nine hours with a consumption of only one pennyworth of gas, it was surprising that it was not more generally used.

The report was unanimously adopted, the dividend declared, and the Directors and officials thanked for their services.

CAMBRIDGE GAS COMPANY.

Success of the Co-Partnership Scheme.

The Half-Yearly General Meeting of the Cambridge University and Town Gas Company was held last Tuesday—Mr. W. B. REDFERN (the Vice-Chairman) presiding, in the absence of Mr. E. H. Parker.

The SECRETARY (Mr. A. E. King) having read the notice convening the meeting, the report and accounts for the six months ended the 30th of June last were presented. The latter showed a balance of £6452 carried to the profit and loss account, compared with £6093 for the first half of last year, and a sum of £21,778 available for distribution. The Directors recommended the payment of dividends at the maximum rates, less income-tax.

On the motion of the CHAIRMAN, seconded by Mr. FOSTER, the report was adopted.

The CHAIRMAN then said he had a statement to make to the shareholders; and he thanked the staff for supplying him with much information in connection with it. First of all, he thought they might congratulate themselves on the increase of business which had taken place during the past year. There was a slight diminution in the receipts, owing to the price of gas having been reduced 1d. per 1000 cubic feet since last year; but this was compensated for by a reduction in the price of coal and the general economic working of the Company. Having given particulars to show how the business had increased, especially through the use of gas-stoves and slot meters and cookers, thanks in a large measure to the Company's excellent show-rooms, he said the result had been that 6 million cubic feet more gas had been made. Passing on to refer to the Gas Companies (Standard Burner) Bills, he reviewed the proceedings upon them in Parliament, and said it was a little difficult to understand the reason for the opposition they had met with, as they were in the best interests of the consumers of gas. The new test-burner had been prescribed by the Metropolitan Gas Referees for the London Companies, and had been in use by them for the last five years. It had been adopted by the Board of Trade on the recommendation of their technical advisers; and it was the test-burner inserted in every Gas Provisional Order made by the Board of Trade. It had also, under the authority of Parliament, been incorporated in the Model Clauses for gas testing; and altogether there were some 100 companies and local authorities who were now using it. Therefore the adoption of a standard test-burner was clearly in the interests of uniformity, and strictly conformed to the decision of the Gas Referees, the Board of Trade, and Parliament. Referring next to the Company's co-partnership scheme, which he said had been promoted by their excellent Chairman (Mr. Parker), in conjunction with the Engineer and Manager (Mr. J. W. Auchterlonie) and the Secretary (Mr. King), the Chairman explained the basis of it, and said that though it was not actually started till the beginning of the year, it was made retrospective, and the bonus was given to the men as from July 1, 1909. Altogether, there were 161 co-partners. Of these, 25 had already qualified to become shareholders; and there were 20 others whose bonuses were within a few shillings of the required amount. He was given to understand that practically all of these would pay in the amounts, so that they might become shareholders at once. The Directors had every reason to hope and believe that co-partnership would be a great all-round benefit to the Company, as it had proved to others. They considered it would be an inducement to the men to feel that they were benefited by the work they did.

The retiring Directors (Messrs. Darwin and Heycock) and Auditor (Mr. Tansley Witt) were then re-elected; and the proceedings closed with a vote of thanks to the Chairman, Directors, and staff.

The Directors of Messrs. C. & W. Walker, Limited, have decided to pay an interim dividend for the six months ending July 31, at the rate of 5½ per cent. per annum, less income-tax, on the cumulative preference shares; and on the ordinary shares at the rate of 10 per cent. per annum, less income-tax.

COMMERCIAL GAS COMPANY.

The Half-Yearly Report and Accounts.

The following is the report that the Directors of the Commercial Gas Company will present at the half-yearly meeting on Thursday.

The revenue account shows a net profit of £74,451 9s. 9d. for the half year, which, added to the balance of £31,739 18s. 9d. brought forward from last year, produces a net revenue balance of £106,191 8s. 6d. Deducting therefrom £9082 12s. 6d. for interest, there remains standing to the credit of the net revenue account a balance of £97,108 16s. available for dividend. The Directors recommend the payment of dividends at the rates of £5 4s. per cent. per annum on the 4 per cent. stock of the Company, and of £5 per cent. per annum upon the 3½ per cent. stock, both less income-tax. The balance of the net revenue will be carried forward to the next half year. The Directors have reduced the price of gas from 2s. 6d. to 2s. 4d. per 1000 cubic feet as from the taking of the Midsummer indices.

The accounts accompanying the report consist of the usual set of statements. They show that the paid-up stock on the 30th of June amounted to £996,405; that £1,076,875 had been added by conversion, making £2,073,280; and that £149,298 remained unissued out of the total authorized capital (including premiums) of £2,235,000. The total amount borrowed on the above-named date was £339,062 10s., and £135,937 10s. was added by conversion; making a total of £475,000, and leaving £79,226 to be borrowed, out of the £550,000 authorized. Capital account receipts amount, with premiums, to £2,606,065 4s. 5d. The expenditure stands at £1,447,007 4s. 3d., with a nominal amount of £1,212,812 10s. added by conversion—together, £2,659,819 14s. 3d. There is consequently a balance of £53,754 9s. 10d. carried to the balance-sheet. The net expenditure on capital account in the half year was £3240 (£3487, less £247 received for meters sold), apportioned as follows: New and additional mains, services, &c., £1338; stoves, £1582; prepayment meters and fittings, £567. The reserve fund amounted at the close of June to £34,969; and the insurance fund to £31,495. The following is the

REVENUE ACCOUNT.

Expenditure.

Manufacture of gas—			
Coal and oil, including dues, carriage, unloading, and trimming	£84,569 11 9		
Salaries of Engineer and officers at works	2,804 0 0		
Wages (carbonizing)	12,108 16 10		
Purification, including labour	1,540 2 10		
Repair and maintenance of works and plant, materials and labour (less £501 18s. 3d. received for old materials)	29,803 12 2		
		£130,826 3 7	
Profit sharing		2,836 9 1	
Distribution of gas—			
Salaries and wages of officers (including rental clerks)	£4,840 8 6		
Repair, maintenance, and renewal of mains and services, material and labour	6,964 1 5		
Repair and renewal of meters	2,008 0 7		
,, ,, ,, ,, stoves	8,087 2 3		
,, ,, ,, ,, prepayment meters and fittings	10,912 8 11		
Incandescent mantle maintenance	620 2 8		
		33,452 4 4	
Public lamps—lighting and repairing		2,491 15 2	
Rent, rates, and taxes		12,756 17 9	
Management—			
Directors' allowance	£1,250 0 0		
Company's Auditors	75 0 0		
Salaries of Secretary, Accountant, and clerks	1,352 10 4		
Collectors' salaries and commission	1,740 17 1		
Prepayment meter collection	2,958 13 11		
Stationery and printing	913 19 1		
General charges	1,591 10 3		
		9,882 10 8	
Bad debts		685 6 3	
Law and parliamentary charges		346 18 11	
Superannuations and allowances		1,213 4 7	
Official officers, &c.		160 4 5	
Total expenditure		£194,651 14 9	
Balance carried to net revenue account		74,451 9 9	
		£269,103 4 6	

Receipts.

Sale of gas—			
Common gas per meter at 2s. 6d. per 1000 cubic feet (100,694)	£193,181 11 10		
Public lighting and under contracts, common gas	5,666 10 8		
	£198,851 2 6		
Less discounts and allowances	3,938 4 3		
		£194,912 18 4	
Rental—			
Meters (23,599)	£2,844 6 11		
Stoves (61,013)	9,734 6 5		
Prepayment meters (76,325)	12,718 18 4		
Incandescent mantle maintenance	626 1 6		
		25,923 13 2	
Residual products—			
Coke, less £3573 18s. 6d. for labour	£28,336 17 2		
Breeze, less £1125 17s. 10d. for labour	1,644 14 4		
Tar	8,113 17 1		
Ammoniacal liquor and sulphate of ammonia	10,115 4 6		
		48,210 13 1	
Miscellaneous receipts—			
Rent receivable	£28 5 0		
Transfer fees	27 15 0		
		56 0 0	
Total receipts		£269,103 4 6	

The following are the statements relating to the manufacturing operations of the Company in the half year:—

Statement of Coals and Oil.

—	In Store Dec. 31, 1909.	Received During Half Year.	Carbonized During Half Year.	Used and Sold During Half Year.	In Store June 30, 1910.
	Tons.	Tons.	Tons.	Tons.	Tons.
Coal	29,712	89,738	93,519	579	25,352
Oil—gallons . .	468,279	1,238,916	1,338,134	..	369,061

Statement of Residual Products.

Description.	In Store Dec. 31, 1909.	Made During Half Year.	Used During Half Year.	Sold During Half Year.	In Store June 30, 1910.
Coke—tons	1,232	57,280	11,884	44,102	2,525
Breeze—tons.	3,947	9,713	..	10,284	3,376
Tar—gallons	554,286	1,119,068	..	1,115,285	558,069
Ammoniacal liquor—butts of 108 gallons	10,279	33,087	38,074	..	5,292
Sulphate of ammonia—tons	130	1,209	..	1,259	80

Statement of Gas Made, Sold, &c.

Quantity Made.	Quantity Sold.		Quantity Accounted for.	Number of Public Lights.
	Public Lights and under Contracts (estimated).	Private Lights, per Meter.		
Thousands.	Thousands.	Thousands.	Thousands.	
1,706,462	36,650	1,551,899	1,614,146	3913

The remaining statement is the balance-sheet, which gives the value of the stores in hand at the close of the half year as follows: Coal, oil, &c., £20,521; coke and breeze, £1665; tar, ammoniacal liquor, sulphate of ammonia, &c., £7505; sundry stores, £32,866—total, £62,557. The figures this time last year were: Coal, oil, &c., £26,129; coke and breeze, £2738; tar, ammoniacal liquor, sulphate of ammonia, &c., £7418; sundry stores, £35,012—total, £71,297. A sum of £16,073 stands in the balance-sheet as employees' bonus and savings, compared with £19,126 at the end of June, 1909.

BROMLEY AND CRAYS GAS COMPANY.

The Modernized Works and Concentrated Plant.

The Half-Yearly General Meeting of this Company was held last Thursday, at the works—Mr. ALEXANDER DICKSON in the chair.

The SECRETARY (Mr. H. W. Amos) having read the notice convening the meeting, the report of the Directors, with the accounts for the six months ended June 30, was presented. The profit on the half-year's working was shown to be £10,922, and the amount available for distribution £11,842. The Directors recommended dividends at the rates of 6, 4½, and 5½ per cent. per annum on the different classes of stock, less income-tax. These would absorb £9261, and leave £2581 to be carried forward. It was stated in the report that most satisfactory results continued to be obtained from the concentration of the manufacturing plant at the Bromley works.

The CHAIRMAN, in moving the adoption of the report, said the object of holding the meeting at the works was to give the proprietors an opportunity of inspecting the plant. As they knew, the works had been recently adapted to meet the enlarged requirements of the amalgamated districts, at an outlay of some £20,000; and it occurred to the Directors that the shareholders might like to see the works with the alterations. He hoped that those of them who were present might have availed themselves of the opportunity. If they had done so, he was sure they had noticed the great alterations and improvements which had been effected within the course of the last fifteen years, and their thoroughly up-to-date condition, as well as their substantial character—features which should be most gratifying, he was sure, to every proprietor. The works had been accurately and technically described in the "JOURNAL OF GAS LIGHTING;"* therefore he did not propose to enter upon details. He would only add this—that, after reasonable trial, the Directors had so far found no reason to be other than satisfied with both works and plant, and also with the economical advantages already realized and in course of development by the unification scheme. Having dealt with several matters incidental to the working in the half year, the Chairman said the variations which had taken place had not imperilled in any way the Company's financial position, as the undivided profit balance carried forward was nearly £200 more than it was this time last year; a sum of about £7000 having meanwhile been written off in part payment of the outlay upon the unification of the works. He doubted if the proprietors could have anticipated any statement more, or so much, to their satisfaction. This satisfaction should be shared by the consumers, whose prospects were thus being so greatly enhanced by everything the Directors did in embodying in the undertaking all modern scientific methods of manufacture, and ensuring its adequacy to meet their ever-growing demands. After some further remarks, the Chairman said he thought it was not necessary to review in very great detail the fluctuations of income and expenditure during the half year. The reduction of income in consequence of the reduced price of gas, and the less quantity of coke and sulphate of ammonia sold, was *pro tanto* set off by better sales of tar and increased income from fittings and stoves. Yet there was a net disadvantage of £1852. On the other hand, the saving by the more favourable purchase of coals, by reduced manual labour, and in other ways, yielded a net advantage in expenditure of £2046, which thus provided them with the additional balance of just about £200 to be carried forward.

The DEPUTY-CHAIRMAN (Mr. Bertram H. Latter) seconded the motion; and it was carried unanimously.

The dividends recommended having been declared, it was resolved, on the motion of Mr. A. WRIGHT, seconded by Mr. A. DICKSON, jun., that the remuneration of the Directors be £1430 per annum, until otherwise terminated in general meeting.

Mr. W. B. BRYAN proposed a vote of thanks to the Directors and officers, for the able manner in which they had conducted the Company's affairs during the past half year.

Mr. J. T. ARNAUD seconded the motion; and it was carried.

The CHAIRMAN briefly acknowledged the vote.

* Descriptions of the alterations carried out at the works by the Company's Chief Engineer, Mr. William Woodward, will be found in the "JOURNAL," Vol. CI., p. 22, and Vol. CIX., pp. 794, 869.

GLASGOW CORPORATION GAS SUPPLY.

The Rates Fixed.

At a Meeting of the Glasgow Town Council held last Tuesday, the Gas Committee submitted the following table of charges for gas for the year ending the 31st of May next; the subject having been deferred from the previous meeting.

Within the City Supply District.

I.—Lighting and domestic purposes—	
For quantities of less than 500,000 cubic feet	2s. 0d.
Beyond 500,000 cubic feet up to 6,000,000 cubic feet . .	1 11
Beyond 6,000,000 cubic feet up to 10,000,000 cubic feet .	1 10
Beyond 10,000,000 cubic feet	1 9
II.—For power and manufacturing purposes—	
For quantities of less than 20,000 cubic feet	2 0
Beyond 20,000 cubic feet up to 500,000 cubic feet. . .	1 8
Beyond 500,000 cubic feet up to 6,000,000 cubic feet . .	1 7
Beyond 6,000,000 cubic feet	1 6
III.—For hotels, clubs, and institutions, other than for lighting purposes—	
For quantities of less than 100,000 cubic feet	2 0
Beyond 100,000 cubic feet up to 500,000 cubic feet . .	1 8
Beyond 500,000 cubic feet up to 6,000,000 cubic feet. .	1 7
Beyond 6,000,000 cubic feet	1 6
Consumers will only be entitled to be charged the rates under Scales II. and III., as and from the date of application therefor.	
The above rates to be applicable only for gas consumed in one and the same premises, and such supply to be measured by a separate meter.	
IV.—Supply through prepayment meters	2s. 7d.
Public lamps	1 9

Within the Supplementary Supply District.

I.—With the exception of the parish of Old Kilpatrick, 1s. per 1000 cubic feet extra on the above-mentioned rates.

II.—Within the parish of Old Kilpatrick, 2d. per 1000 cubic feet extra on the above-mentioned rates.

If the whole of the above rates are adopted, the estimated deficiency at the end of the year will amount to about £18,000.

The matter was considered at the meeting of the Council on Thursday.

Mr. M. W. MONTGOMERY, the Convener of the Gas Committee, moved the adoption of the rates. He said they had been fixed in virtue of the powers under the recent Act, and he hoped by them to secure some new customers and retain the old ones. With regard to the extra charge for the parish of Old Kilpatrick, he explained this was made to preserve their right as to the district being within the supplementary area of supply.

Bailie PAXTON, the Sub-Convener of the Committee, seconded the motion.

Mr. COSH said the net cost of gas was 1s. 11½d. per 1000 cubic feet. The proposal of the Committee was to reduce to 1s. 8d. the rate for power and manufacturing purposes for gas supplied beyond 20,000 cubic feet. Last year in this section the Committee lost to the extent of £8000. The manufacturer, as soon as he consumed £20 worth of gas, was to be entitled to a rebate of 4d. per 1000 cubic feet; whereas the person using gas for lighting and domestic purposes in quantities in excess of 500,000 cubic feet was only to be allowed a rebate of 1d. In the recent propaganda against black smoke, it was emphasized that the domestic fire was the greatest sinner, and householders were recommended to adopt gas. Yet they went to these people and said, after they had run up an account of £50, they were to get a reduction. Let them think of the proposal as applied to a two-room and kitchen house. He could not understand how such a proposal ever emanated from a committee of business men. Mr. Cosh also called attention to the statement of the Committee that the substantial increase in the sale of gas last year was largely due to the extended use of it for domestic purposes, and also to the rapidly increasing demand for gas on the prepayment system. He calculated the profit on the latter at £10,000; and yet they proposed to charge for the gas 7d. more than to the people who were paying the ordinary domestic rate. He supposed they would be told that the price of meters accounted for the increase. Yet the people who contributed this profit were the people who were to get no consideration. He imagined that the reason a reduction was not made was because the people affected were poor, and were not able to pull the strings like the large manufacturers. He moved, as an amendment, that the matter should be remitted, and that the Committee should consider the advisability of reducing the prepayment rate from 2s. 7d. to 2s. 5d.

Bailie ALSTON seconded the amendment.

Mr. MONTGOMERY said the charge for the prepayment meters had been very carefully calculated. In Edinburgh, the difference of charge between ordinary meters and the prepayment meters was 1s. 2d.; in Glasgow, it was 7d. The table of rates was, he admitted, largely experimental, and he hoped the Council would accept them, so that at the end of the year they would be able to see the result.

The motion was carried by a large majority.

SULPHATE OF AMMONIA COMMITTEE.

Report for the Past Financial Year.

At the Annual Meeting of the Sulphate of Ammonia Committee, held recently, the Executive Committee submitted the thirteenth report, together with a statement of accounts for the year ended the 30th of June last, and an estimate of the probable expenditure to June 30, 1911. Mr. W. G. Blagden, who had been Chairman of the Committee since its formation, found it imperative to relinquish the position; and his resignation was accepted with the utmost reluctance and regret. Mr. Milne, of the Gaslight and Coke Company, who had for some years filled the office of Deputy-Chairman, was unanimously elected to succeed Mr. Blagden. We have received from the Secretary (Mr. A. Dawson) a copy of the report, the principal portions of which are reproduced below.

As a result of interviews with the representatives of the Continental makers of sulphate of ammonia, the Executive Committee resolved to carry on more vigorous propaganda both at home and abroad; and, with a view to meeting the new burden thereby entailed, it was decided to take powers to levy an increased subscription limited to 8d. per ton, and for the present fixed at 7d. per ton.

The Committee decided to engage a new official to superintend the extended experimental work of the new home propaganda; and, after interviewing various candidates, the Executive Committee, at a meeting held on Oct. 15, 1909, appointed Mr. W. Popplewell Bloxam, B.Sc. (Lond.), F.C.S., F.I.C., who has held several important official appointments under the Admiralty and the Governments of Madras and Bengal, and finally under the Government of India. Shortly after his appointment, Mr. Bloxam visited Germany, and made himself familiar with the most successful German propaganda, which has disposed of the total annual production of sulphate of ammonia of that country for the benefit of German agriculture. The German system, involving the delivery of lantern lectures to farmers, discussion after lectures on matters agricultural, and the subsequent establishment of small experimental plots, seemed admirable and well adapted to British requirements.

After making careful inquiry, it seemed at first impossible to carry out plot work on any large scale in this country, owing to the impossibility of supervising the plots with only the services of our limited staff. Certain Professors at Agricultural Colleges, however, were kind enough at this stage of affairs to recommend men (graduates or diploma men in Agriculture) to act as "local supervisors." This suggestion was followed up, with the result that some thirty duly qualified men, widely distributed over the country, were appointed to act as "local supervisors." Each of these gentlemen is responsible for the supervision of at least twenty one-tenth-acre plots, for the choice of the plots, measuring out, manuring and harvesting of the crops, and the provision of detailed reports.

The scope of sulphate of ammonia having been somewhat unduly restricted in the manurial experiments of former years to roots and potatoes, in the new series of plots (of one-tenth of an acre), some 700 in number, the beneficial effect of sulphate of ammonia as a manure is being submitted to tests in the case of the following crops: Cereals—barley, oats, and wheat. Roots—mangels, swedes, turnips, and Kohl Rabi. Grass—hay and permanent pasture. Also with potatoes and cabbage. These plots are distributed over fifteen counties in England, five in Wales, and three in Scotland. For these, the manures are provided by the Committee carriage paid to the nearest railway station to the plots. The Committee are also responsible for all expenses of supervision and report. A new feature of the plot work is the erection of enamelled iron placards on the experimental plots. These placards are lettered "MANURED WITH SULPHATE OF AMMONIA," in blue on a white ground, and are backed with wood and attached to wooden uprights 9 feet in height.

The opinion was strongly held that the power of the farmer to experiment on his own land with crops of his own choosing, employing sulphate of ammonia in association with potash and phosphoric acid, under conditions involving no loss to himself, cannot fail to establish a strong demand throughout the country for the use of sulphate of ammonia on a large scale. By the employment of the local supervisors, it is possible to get experiments made and supervised on farmers' own land on a scale which will fairly bear comparison with the results of the German field experiments, which have, however, the palpable advantage of the services of a large permanent staff and of an annual expenditure of £20,000.

Mr. Bloxam prepared a suitable course of lectures, new lantern slides were made for the purpose, and a lantern and accessories purchased. Arrangements were made with the Secretaries of Agricultural Societies, Farmers' Clubs, &c., with the result that 24 lectures were delivered in the following places and in the order named, commencing on Jan. 24 and ending April 30: Billericay, Ripon, Rotherfield, Wadhurst, Puddletown, Epsom, Wigan, Liverpool, Atherton, Leigh, Blandford, Newport (Isle of Wight), Snaith, Darlington, Wareham, Framlingham, Thorpe-le-Soken, Bishop's Stortford, Reading, Stockton-on-Tees, Aspatria, Tadcaster, Usk, and Carlisle. The audiences varied in number from 20 to 150. The greatest interest was taken in the discussions, and good reports were furnished by the Provincial Press. Many one-tenth-acre plots have been laid down on the farmers' own land; and reports subsequently made have shown that the local sales of sulphate of ammonia have uniformly increased throughout the districts where lectures were given—the local sales being stated in certain cases as twice or thrice as great in 1910 as in the preceding year.

Two points in connection with local sales deserve, as Mr. Bloxam suggests, special attention on the part of subscribers to the Sulphate of Ammonia Committee: (*a*) The advisability of makers in agricultural districts holding stocks of sulphate of ammonia to meet the strong demand of the early spring months. (*b*) The necessity for producers to quote a favourable price for sulphate of ammonia to dealers and manure merchants of their districts; such prices to allow a sufficient margin of profit to induce the dealer to devote himself seriously to the sale of sulphate of ammonia.

The great value of the agricultural competitions which had been carried out for some years previously for the Committee's prizes was fully recognized; and their continuation on an extended scale has been decided on. It was decided to express the value of the crop increases obtained year by year in the agricultural competitions by the use of sulphate of ammonia not only in weights and measures as formerly, but as crop profits, showing the money gain obtained per acre. Accordingly, taking the results of the competitions of the season 1908-9, these were reduced to sterling values, and then showed profits varying from £27 per acre in the case of potatoes to £6 per acre in the case of yellow turnips. These statements of crop profits have been widely circulated among the subscribers and farmers, and have been shown on the screen at all lectures, and it is considered that they constitute one of our strongest holds upon the farmers of this country; for these competitions are carried out on the farmers' own lands by the farmers themselves, on a scale of one to three acres, and the decisions as to crops and prizes are made by judges of acknowledged standing in the districts in question.

The foreign propaganda referred to in the last annual report is being energetically carried on by the Committee in the following countries, in association with the Belgian, French, and German sulphate of ammonia makers: Denmark, Southern Sweden, the Baltic Provinces of Russia, and Finland, Switzerland, and Spain. On the 13th of May last, a conference of British sulphate of ammonia makers was called together in London for the purpose of meeting and discussing matters of mutual interest with the representatives of Sulphate of Ammonia Associations of Germany, Belgium, and the United States of America. It was there disclosed that the foreign Associations were all receiving from their respective subscribers a much more liberal measure of support than is being extended to our Committee by British makers, as the following figures, which speak for themselves, will show:—

	Gt. Britain.	Germany.	U.S.A.	France.	Belgium.
Production, tons . .	348,000	322,000	106,000	54,000	35,000
Home consumption tons	85,000	330,000	140,000	65,000	55,000
Contribution to propaganda, per ton .	7d.	2/-	10d.	1/7	1/8
Contributing percentage of total production	60	90	100	90	90

A report of this meeting was circulated among all the British makers of sulphate of ammonia (subscribers and non-subscribers), together with an appeal to the latter to join the Committee. This appeal had the effect of inducing some most important makers to become subscribers, while others of equal importance have promised to give the matter their careful consideration, with, as is anticipated, favourable final results.

The Committee have to report the accession of sixteen new subscribers during the past financial year, with an estimated total production of about 13,000 tons. The subscriptions for the year again reveal an increase in the total tonnage of subscribers; but as practically all the new members have only joined as from the 1st of July, their estimated production of 13,000 tons does not enter to any material extent into the following figures: July, 1908, to June, 1909, inclusive, 232,000 tons; July, 1909, to June, 1910, inclusive, 211,000 tons—increase, 9000 tons.

Accompanying the report was the following

LIST OF SUBSCRIBERS TO SULPHATE OF AMMONIA COMMITTEE.

Abersychan Gas Company
Abingdon Gas Company
Albright and Wilson, Limited, Oldbury
Alliance and Dublin Consumers' Gas Company
Alloa Gas Commissioners
Alnwick Gas Company
Alva, Burgh of, Gas Department
Ambleside Urban District Council Gas Department
Andover Lighting and Power Company
Arbroath Corporation Gas Department
Atherton Urban District Council Gas Department

Bagley, Mills, and Co., Ltd., London and Alfreton
Bangor Corporation Gas Department
Barnet District Gas and Water Company
Barnstaple Gas Company
Bath Gas Company
Bearpark Coal and Coke Co., Ltd., Middlesbrough
Beccles Water and Gas Company
Bedford Gas Company
Bideford Gas Company
Bilston Gas Company
Birchenwood Colliery Co., Ltd., Kidsgrove, Staffs.
Bird and Son, Limited, Cardiff
Bishop's Stortford and District Gas Company
Blackburn Corporation Gas Department
Blyth and Cowpen Gas Company
Bodmin Gas Company
Bolckow, Vaughan, and Co., Ltd., Middlesbrough
Bolton Corporation Gas Department
Boston (Lincs.) Gas Company
Bournemouth Gas and Water Company
Bowes, J., and Partners, Ltd., Newcastle-on-Tyne
Bradford Corporation Gas Department
Braintree and Bocking Gas Company
Brentford Gas Company
Bridgnorth Corporation Gas Department
Bridgwater Gas Company
Bridport Gas Company
Brighouse Corporation Gas Department
British Gaslight Company, Limited (Etruria, Holywell, Hull, Norwich, and Trowbridge)
Bromsgrove Gas Company
Brown, John, and Co., Limited, Sheffield
Broxburn Oil Company, Limited, Glasgow
Brunner, Mond, and Co., Limited, Northwich
Burnley Corporation Gas Department
Bury Corporation Gas Department
Butler, Wm., and Co., Limited, Bristol

Calne Gas Company
Calverley and Horsforth District Gas Company
Canterbury Gas and Water Company
Cardiff Steam Coal Collieries Co., Limited
Carlisle Corporation Gas Department
Carnarvon Corporation Gas Department
Carlow Gas Company
Carlton Iron Co., Limited, Ferryhill
Carnbroe Chemical Co., Limited, Glasgow
Catchpole, E., and Sons, Rotherhithe
Chance and Hunt, Limited, Oldbury
Chard Corporation Gas Department
Chelmsford Gas Company
Cheltenham Gas Company
Chester United Gas Company
Chichester Gas Company

Chigwell, Loughton, and Woodford Gas Company
Chorley Corporation Gas Department
Christchurch Gas Company
Cirencester Gas Company
Coal Distillation Co., Limited, Middlesbrough
Cochrane and Co., Limited, Middlesbrough
Cockermouth Urban District Council Gas Depart-
Colchester Gas Company [ment
Colne Corporation Gas Department
Coltness Iron Co., Limited, Glasgow
Consett Iron Co., Limited
Cork Gas Consumers' Company
Coventry Corporation Gas Department
Cowdenbeath Gas Company
Crewkerne Gas Company
Cromer Gas Company
Croydon Gas Company

Dalmellington Iron Company, Limited
Dalmeny Oil Company, Limited
Daventry Gas Company
Derby Gas Company
Dewsbury Corporation Gas Department
Dorchester Gas Company
Dorking Gas Company
Douglas (Isle of Man) Gas Company
Drighlington and Gildersome Gas Company
Drogheda Corporation Gas Department
Droitwich Corporation Gas Department
Dundalk Gas Company
Dungannon Gas Company

East Grinstead Gas and Water Company
Ebbw Vale Steel, Iron, and Coal Company, Limited
Edinburgh and Leith Corporations Gas Commis-
Elland-cum-Greetland Gas Company [sioners
Enfield Gas Company
Exeter Gas Company
Exmouth Gas Company

Farnley Iron Company, Limited, Leeds
Faversham Gas Company
Felixstowe Gas Company
Fermoy Gas Company
Filey Urban District Council Gas Department
Fleetwood Gas Company
Folkestone Gas Company
Furnace Gases Company, Limited, Glasgow

Gaslight and Coke Company (The)
Glasgow Iron and Steel Company, Ltd., Wishaw.
Glastonbury Corporation Gas Department
Glengarnock Chemical Company, Limited
Glengarnock Iron and Steel Company, Limited,
Gloucester Gas Company [Stevenston, N.B.
Godalming Gas Company
Gravesend and Milton Gas Company
Great Grimsby Gas Company
Great Western Colliery Company, Limited, Cardiff
Great Wigston Gas Company
Great Yarmouth Gas Company
Guest, Keen, and Nettlefolds, Limited, Birming-
ham and Dowlais

Halifax Corporation Gas Department
Halstead Gas Company
Hampton Court Gas Company
Harrow and Stanmore Gas Company
Hartlepool Gas and Water Company
Harvey, T. H., Portsmouth and Plymouth
Hasland Coking Company, Limited, Chesterfield
Hayward's Heath District Gas Company.
Heath, R., and Sons, Limited (Biddulph Valley
Iron Works), Stoke-on-Trent
Hereford Corporation Gas Department
Herne Bay Gas Company
Heywood Corporation Gas Department
High Wycombe Gas Company
Hoddesdon Gas and Coke Company
Horley District Gas Company
Horncastle Urban District Council Gas Department
Huddersfield Corporation Gas Department
Hunt, J. T., and Son, Limited, Stratford, E.

Ilkeston Corporation Gas Department
Inverness Corporation Gas Department
Ipswich Gas Company

Jersey Gas Company

Keighley Corporation Gas Department
Kendal Corporation Gas Department
Kidderminster Gas Company
Kildwick Parish Gas Company
Kilkenny Gas Company
Kingston-on-Thames Gas Company

Lambton Collieries, Limited, Newcastle-on-Tyne
Langley Mill and Heanor Gas Company
Langloan Iron Company, Ltd., Coatbridge, N.B.
Langwith Bye-Product Company, Limited, Sheep-
Launceston Gas Company [bridge, Chesterfield
Leicester Corporation Gas Department
Leominster Gas Company
Lewes Gas Company
Lichfield Gas Company
Limerick Corporation Gas Department
Lisburn Gas Company
Littleborough Gas Company
Littlehampton Gas Company
Long Eaton Gas Company
Longford District Gas Company
Longwood Gas Company
Lord, J. E. C., Weaste, near Manchester
Louth Gas Company

Mackey-Seymour Engineering and Coke Oven Co.,
Maldon Gas Company [Limited, Leeds
Malton Gas Company
Malvern Urban District Council Gas Department
Manchester Corporation Gas Department
Mansfield Corporation Gas Department
Manvers Main Collieries, Limited, Rotherham
Market Harborough Urban District Council Gas
Marlborough Gas Company [Department
Maryport Urban District Council Gas Department
Matlock and District Gas Company
Melksham Gas Company
Merthyr Tydfil Gas Company
Middlesbrough Corporation Gas Department
Middleton Corporation Gas Department
Mid-Kent Gas Company, Snodland
Miller, John, and Co., Aberdeen
Mitchell Main Colliery Company, Ltd., Barnsley

Neath Corporation Gas Department
Ness, Thos., Limited, Darlington
Newcastle-on-Tyne and Gateshead Gas Company
Newmarket Gas Company
Newport (I. of W.) Gas Company
Newton, Chambers, and Co., Limited, Sheffield
Newtownards District Council Gas Department
North Bitchburn Coal Company, Ltd., Darlington
North Eastern Steel Company, Limited, Middles-
Northwich Gas Company [brough

Oakbank Oil Company, Limited, Glasgow
Omagh Gas Company
Ormskirk Gas Company
Otto-Hilgenstock Coke-Oven Company, Limited,
Crigglestone

Paignton Gas Company
Pease and Partners, Limited, Darlington and Crook
Perth Gas Commissioners
Peterborough Gas Company
Peterhead Corporation Gas Department
Pilkington Bros., Limited, St. Helens
Plumbe, W. A. (Sherwood Chemical Works),
Mansfield
Plymouth and Stonehouse Gas Company
Pontypridd Urban District Council Gas Depart-
Portadown Gas Company [ment, Treforest
Powell-Duffryn Steam Coal Company, Limited,
Prescot Gas Company [Cardiff
Preston Gas Company
Priestman Collieries, Limited, Newcastle-on-Tyne
Pumpherston Oil Company, Limited, Glasgow

Queenstown Gas Company

Radcliffe and Pilkington Gas Company
Ramsgate Corporation Gas Department
Reading Gas Company
Redcar, Coatham, Marske, and Saltburn Gas Com-
Redhill Gas Company [pany
Rhondda Urban District Council Gas Department,
Richmond Gas Company [Pentre
Riddings District Gas Company, Pye Bridge
Ripon Corporation Gas Department
Rochdale Corporation Gas Department
Romsey Gas Company
Ross, J., and Co., Falkirk, N.B.
Runcorn Gas Company

Sadler and Co., Limited, Middlesbrough
Salamon and Co., Limited, Rainham
Salford Corporation Gas Department
Salisbury Gas Company
Samuelson and Co., Limited, Middlesbrough
Sandown (I. of W.) Gas Company
Scarborough Gas Company
Seaham Gas Company, Seaham Harbour
Seaton Carew Iron Company, Limited, West
Selkirk Gas Company [Hartlepool
Shanghai Gas Company, Limited
Shanklin (I. of W.) Gas Company
Sheffield United Gas Company
Shrewsbury Gas Company
Silsden Urban District Council Gas Department
Simon-Carves Bye-Product Coke-Oven Construc-
tion Company, Limited, Manchester
Sligo Gas Company
Southgate (New) and District Gas Company
South Metropolitan Gas Company
South Shields Gas Company
South Suburban Gas Company
Spalding Urban District Council Gas Department
St. Albans Gas Company
St. Anne's-on-the-Sea Gas Company
St. Austell Gas Company
Stafford Coal and Iron Company, Limited, Stoke-
Stafford Corporation Gas Department [on-Trent
Stanley and District Gas Company
Staveley Coal and Iron Company, Limited,
Stirling Gas Company [Chesterfield
Stobart, H., and Co., Ltd., Etherley, Durham
Stockton-on-Tees Corporation Gas Department
Stone and Tinson, Bristol
Stourbridge Urban District Council Gas Depart-
Stourport Gas Company, Limited [ment
Strakers and Love, Newcastle-on-Tyne
Summerlee Iron Company, Limited, Glasgow
Sunderland Gas Company
Sutton (Surrey) Gas Company
Swanage Gas and Water Company
Swansea Gas Company
Swindon United Gas Company

Tarbrax Oil Company, Limited, Glasgow
Taunton Gas Company
Tavistock Lighting, Coal and Coke Company
Tipperary Gas Company
Tonbridge Gas Company
Torquay Gas Company
Tottenham and Edmonton Gas Company
Tullamore Gas Company
Tunbridge Wells Gas Company
Tweedales and Smalley, Castleton, Manchester
Tynemouth Gas Company, North Shields

Ulverston Urban District Council Gas Department
United Alkali Company
Uttoxeter Gas Company

Ventnor Gas and Water Company
Vickers, Sons, and Maxim, Limited, Sheffield

Walker and Wallsend Union Gas Company
Wallasey Urban District Council Gas Department
Waltham Abbey and Cheshunt Gas Company
Walton-on-Thames and Weybridge Gas Company
Warminster Gas Company
Warrington Corporation Gas Department
Waterford Gas Company
Wath Main Colliery Co., Ltd., near Rotherham
Wedgwood (Representatives of the late John),
Bignall Hill Colliery, Newcastle, Staffs.
Wellingborough Gas Company
Wellington (Salop) Gas Company
Wells Gas Company
Westbury Gas Company
Westgate and Birchington Gas Company
Weston-super-Mare Gas Company
Wexford Gas Consumers' Company
Weymouth Consumers' Gas Company
Whitwood Chemical Company, Ltd., Normanton
Whitworth Vale Gas Company
Widnes Corporation Gas Department
Wigan Coal and Iron Company, Limited
Wigan Corporation Gas Department
Winchester Water and Gas Company
Windermere District Gas and Water Company
Windsor Royal Gas Company
Wisbech Lighting Company
Woking District Gas Company
Workington Corporation Gas Department
Worthing Gas Company

Yeovil Corporation Gas Department
Young's Paraffin Light and Mineral Oil Company,
Limited, Glasgow

In the course of the preceding report, reference is made to a largely attended meeting of British sulphate of ammonia manufacturers held in London for the purpose of discussing matters of mutual interest with the representatives of Sulphate of Ammonia Associations of Germany, Belgium, and the United States of America. It took place at the offices of the Gaslight and Coke Company, under the presidency of Mr. D. Milne Watson, the General Manager of the Company.

The Chairman opened the proceedings by introducing Mr. M'Ilvray, from the United States, Mr. Sohn, from Germany, and Mr. Kirkpatrick, from Belgium, and said the meeting had been called to hear what these gentlemen had to tell them. In the course of his brief remarks, he pointed out that in Germany very extensive propaganda work was being carried on, for which the manufacturers were contributing at the rate of 2s. per ton, whereas in England the amount was less than 1s. per ton. He then called upon Mr. Milne, who, as already stated, is now the Chairman of the Sulphate of Ammonia Committee, to offer a few explanatory observations.

Mr. Milne complied with the request, and first of all offered, in the name of the Committee, a very hearty welcome to their friends from over the seas. Referring to the Chairman's remark about Germany, he said Mr. Sohn was the working head of the great German Syndicate; and he managed to get from the sulphate makers 2s. per ton on almost the whole of their make, while here we could get but 7d. per ton on only two-thirds of the make. This country was producing annually an increasing quantity of from 20,000 to 30,000 tons of sulphate. The same thing was being done in Germany, and practically the same in America. They had, therefore, to find new consumers for something like 60,000 tons per annum; and it was only right and proper that they should ask every maker to participate in this movement. Each one should go away with the intention of getting at least one maker to join in it. They should use every means to work together in each other's interests, for the increase in the consumption of sulphate in one

part of the world would benefit all other parts. Every maker should join the Association, so that they might get a larger amount of money through new subscribers rather than by increasing the subscription. In this connection, he must thank his Directors and General Manager for the generous way they had always supported the Committee.

Mr. M'Ilvray was the next speaker. He said that about eight years ago sulphate of ammonia began to be put on the American market by the coke-ovens in such quantities that the makers who had the larger part of the sulphate in the United States at their disposal came to his principals and asked them to sell it for them. At that time there was a production of 25,000 to 30,000 tons; but now there were about 110,000 tons—an increase steadily of about 12,000 to 15,000 tons a year. In taking the Illinois States, they tried to build up a trade round the coke-ovens. It was hard work, because nitrate of soda was supplying all the requirements. Their method of working was this. A representative would visit the experimental stations at least twice a year, and talk the matter over. In this way they had no difficulty in showing that by using sulphate of ammonia higher results by something like 10 per cent. could be obtained than with nitrate of soda. The farmers found that by using sulphate the grass grew up thick and strong; and the result was that nitrate was not able to compare with sulphate to-day. Then they went down to the South—to the cotton fields. Nobody wanted sulphate of ammonia; they were prejudiced against it, and would not give it a fair chance. So his principals made up their minds to go down and make experiments for themselves. The result was that sulphate of ammonia was now being used in preference to nitrate of soda. To-day they were paying in about 20 c. a ton, and spending it in propaganda work; and at the same time English people were selling in America about 40,000 tons of sulphate a year, and Americans were selling about 100,000 tons. They were thus spending the money and making a market for others. He therefore begged of the meeting to do as Mr. Milne had suggested—get every man who produced a ton of sulphate to join them; and if they would get the money for the Committee, he was satisfied they would use it in a judicious way. By the right kind of propaganda work, they could make a good market for sulphate of ammonia, and be able to realize, as time went on, even better prices than were being obtained to-day.

At the request of the Chairman, Mr. Sohn next gave the meeting an indication of what is being done in Germany. He pointed out that during the past ten years the development of the output of sulphate of ammonia had made great strides. In 1900, the world's total production amounted to only 495,000 tons; whereas it is now 961,000 tons, or just about double. He said it might be regarded as certain that this development would continue, even if prices should decline substantially. Up to now, the makers of sulphate had found themselves in a somewhat privileged situation, for, as a rule, the other nitrogenous fertilizers competing with it had been sold at a price keeping, comparatively speaking, far above that of sulphate. But the keen competition going on during the last few years, particularly on the Continent, between the two chief nitrogenous fertilizers had levelled the difference altogether in such a way that now the unit of nitrogen, either of sulphate or of nitrate, fetched the same price. He believed this result would not have been obtained had it not been for the very active propaganda they had devoted to the purpose. It was only a few years ago that the prices of nitrate of soda ruling on the Continent were 25 to 30 per cent. higher than those for sulphate of ammonia; and, notwithstanding this considerable difference, they were not able to sell their production entirely on the Continent, but were obliged to ship large quantities to foreign countries. Owing to the competition thus resulting between English and Continental makes, prices declined sometimes considerably. To-day, they in Germany had attained to such a state of things that in many regions farmers gave the preference to sulphate of ammonia, even if, comparatively, the price of the latter should be a shade higher than that of nitrate. Naturally it depended much on the way one carried on the propaganda. He had found that during the first years their methods were not the best. It was necessary to come into close touch with the farmer and the consumer; and they could not arrive at this simply by office work or by distributing pamphlets and making advertisements. They had established all over the country agencies managed by gentlemen who had had practical and scientific education, and who delivered lectures, and gave advice to farmers—showing them the best methods of using sulphate of ammonia, and establishing experimental plots or fields. The sums devoted to this purpose had, in his opinion, paid back more than a hundredfold their value. He thought it advisable that their system should be adopted for other countries—particularly for those in which good agricultural conditions already existed—*i.e.*, England, France, Italy, Spain, Sweden, Egypt, Portugal, Mexico, India, and later on China, South Africa, and Bulgaria. In conclusion, he expressed the opinion that even with a considerable increase in the output of sulphate it would be possible to maintain present prices, or at least such prices as were comparatively as high as those for nitrate of soda, as long as makers proved equal to their task—*i.e.*, were willing to increase their efforts for the sale and consumption of their product in the same measure that they augmented their output.

Mr. Sohn was followed by Mr. Kirkpatrick, who said that previous to the formation of the Belgian Syndicate in 1907, a number of makers had undertaken to organize a propaganda, which had since been carried on at a great expense. The result had been very satisfactory; the consumption of sulphate of ammonia in Belgium having risen from 19,400 tons in 1913 to 55,000 tons in 1909. This year it would probably be 65,000 tons, on account of the large consumption in the spring. The cost of their propaganda was 2frs. 10c. (1s. 8d.) per ton on the Belgian make and German sulphate imported. The work had been carried out by means of demonstration fields, lectures, newspaper articles, advertisements, pamphlets, posters, &c. Illustrated advertisements showed the good results they obtained. Pamphlets were written for agricultural labourers; others for lecturers and professors who had to teach the peasant. They were largely spread by the Syndicate, or by Agricultural Associations, merchants, and lecturers. They put advertisements on the walls of small towns where markets were held; and affixed labels on the bags, setting forth the advantages of sulphate and the best way of using it; also labels on railway trucks, so as to make the sulphate known, and not be mistaken for nitrate of soda. At the Brussels Exhibition, a special pavilion had been erected, and most of the lawns had there been manured with sulphate. Upwards of 400 demonstration fields had been organized during 1908 and 1909. These fields were taken care of by local professors. Upwards of 100 lectures were given every year, especially in winter, by well-known lecturers, and mostly under the auspices of some Agricultural Association. Pamphlets and samples were distributed during the lectures. The Belgian Syndicate had done a great deal in the propaganda work, and trusted that even better results might reward their efforts.

At the request of the Chairman, Sir Samuel Sadler offered a few remarks. He said that in his visits to the States he had been surprised to find that the land was becoming very short of nutriment indeed; and this fact was evidently dawning upon the natives as well. He was looking forward to the effete part of America being the greatest consumer of sulphate of ammonia within the next twenty years. People in England were not doing what they should do. It was the greatest difficulty in the world to persuade the local farmer to use sulphate of ammonia. Here and there they found a man who thought and read, and who used sulphate of ammonia with good results. Beet and crops of this description increased in growth by the use of sulphate. In England, the idea was prevalent that it was not good for grass; but Mr. M'Ilravy had said it was. Of course, if they did not properly drain their ground, sulphate was of no advantage; but he (Sir Samuel) had found, in the course of his experiments, that with a proper mixture of sulphate and superphosphates a much greater crop could be grown. Sir Samuel concluded as follows: The question to-day is, Is sulphate being produced in excess? I think we can agree that to-day it is not; but what about the near future? Sulphate, if it is properly used, will enable the farmers to reap riches "beyond the dreams of avarice." If farmers use sulphate, we shall not have to depend on foreign countries for our food supplies. The production of nitrate of soda is over 2,000,000 tons a year; sulphate is not 1,000,000 tons. Unless, however, something is done in teaching gradually the people of the world the great value of sulphate of ammonia, it is possible we may arrive at a time when we shall be producing a certain excess of sulphate. This will not be the case if we awake to our possibilities, and join the forces of Germany and Belgium and the United States in one great propaganda, and teach men the advantages of sulphate of ammonia.

Mr. M'Ilravy then gave some statistics as to coke-ovens in America. He said that when the present ovens are replaced, they will be rebuilt on the bye-product method; and the United States will fifteen to twenty years from now be producing 600,000 tons of sulphate a year.

At this point, Mr. Milne said it had been mentioned to him that certain gentlemen present might think the Sulphate of Ammonia Committee had something to do with the regulation of prices. They did nothing of the sort. What they did was to try to increase the use of sulphate throughout the world. If they increased the consumption, the price would take care of itself. The speaker emphasized what had been said as to production and consumption. He pointed out that whereas this country is making 348,000 tons, we only use 85,000 tons of sulphate. Germany makes 322,000 tons, and uses 330,000 tons. This country carries on agriculture on similar lines to Germany, and yet we use one-fourth of our make, while Germany uses more than the whole of hers. He said that this was partly the result of spending only 7d. a ton a year; and this was the first year of spending even this. The Committee were working now on the lines of Germany, France, and the United States. They had organized, through their new Manager, 673 field experiments this year. If they obtained more money, they could do much more work. England spent 7d., Germany 2s., Belgium and France 1s. 7d. each, and the United States 10d. a ton. If these people thought it a good thing to spend money on propaganda, it would not be bad policy for Englishmen to do the same.

After a few further remarks by Mr. Sohn, and some observations by Mr. Page, of the Standard Ammonia Company, Mr. Hanbury Thomas, the General Manager of the Sheffield United Gas Company, said the meeting was indebted to their visitors from abroad for what they had stated. He did not think the Committee needed any converting as to the necessity for propaganda work. Their friends had put before them what had been subscribed in other countries. The Committee had had great difficulty in getting manufacturers to subscribe; and they had not been able to get funds enough to carry out the work they wanted to do. He hoped a report of the meeting would be sent round, so that they would see the importance of subscribing, even if it were up to 2s. a ton. He moved: "That, in thanking Messrs. M'Ilravy, Sohn, and Kirkpatrick for their presence and for the useful information given, this meeting expresses strong approval of the action of the Sulphate of Ammonia Committee in carrying on an energetic propaganda for increasing the consumption of sulphate of ammonia in this and other countries, and pledges itself, individually and collectively, to increase the membership by every means in its power to provide further sums, which are urgently required." Mr. Stanley (of the Simon-Carvès Bye-Product Coke-Oven Construction, &c., Company), in seconding the motion, endorsed the remarks made as to the usefulness of the meeting. The resolution was carried unanimously. The Chairman expressed the opinion that this was a very satisfactory result to arrive at. He added that Mr. Corbet Woodall, as the Governor of the Gaslight and Coke Company, took great interest in the welfare of the Committee; and that the Chairman of the South Metropolitan Gas Company (Mr. Charles Carpenter) had sent a message that he was entirely in sympathy with the object of the meeting. He thanked Messrs. M'Ilravy, Sohn, and Kirkpatrick for being present. He said it was necessary that all should share in the work the Sulphate of Ammonia Committee were doing, if they wished to widen the field for the sale of the article in which they were all interested.

Exmouth Water Scheme.—It was reported at a meeting of the Exmouth District Council last Wednesday that the Water Bill promoted by the Council had received the Royal Assent. The Sanitary Committee recommended that Messrs. Hill and Son, engineers, should be informed that the Council were desirous of proceeding with the scheme without delay, and that they should be asked to prepare the necessary plans and specifications with a view to inviting tenders. The recommendation was adopted.

MANCHESTER MUNICIPAL OFFICIALS' SALARIES.

Report Referred Back.

The report of the Special Committee appointed by the Manchester City Council to consider the conditions of service and salaries of employees of the Corporation came before the members of the Council last Wednesday. The report, covering 225 closely-printed pages, contained a good deal of information apart from the recommendations which have already been dealt with in the "JOURNAL." For instance, it is shown that the employees of the Corporation total 19,667, of whom 4594 are teachers, or other officials of the Education Committee, 4386 are engaged on the tramways, and 2384 are in the Gas Department. The report was subjected to a good deal of criticism by different members of the Council; and in the end it was referred back to the Committee, with instructions to fix a retiring age and a retiring allowance in every instance, and to consult the Employing Committee before bringing the document up again. This will mean, of course, a prolongation of the inquiry, extending over many months.

GAS FINANCES AT BELFAST.

When moving the adoption of the Gas Committee's minutes by the Belfast Borough Council, Mr. J. A. Doran remarked that the accounts for the year to March 31 last had now been completed. The gross profit on the manufacture and sale of gas and residuals was £51,078; being an increase of £6710 over the previous year. From the gross profit, they had to deduct the following: Cost of issue of redeemable stock, £1954; fees paid to gas experts and cost of borings, £1252; and loss on the working of the stoves department, £266—leaving a sum of £47,606. The net profit was £32,609; being an increase of £1546. To this they added the balance brought forward, which gave a total at the credit of the profit and loss account of £41,317, out of which the Committee had set aside the following: Sinking fund, £5664; interest on insurance suspense account, £680; leaving a balance of £34,973. Out of this amount, the Gas Committee had given to the Finance Committee in aid of the rates £15,000; while they had allocated for dividends and sinking fund on the new City Hall stock, £11,387—leaving a balance at the credit of the profit and loss account of £8586. In the year they carbonized 103,113 tons of coal—an increase of 3215 tons; and the price being 1s. 4d. per ton lower, they had reduced the expenditure on this item by £4234. Gas oil also being cheaper, they had a saving in this of £3243, though they used 101,562 gallons more. The total amount used was 2,278,564 gallons. The make of gas was 2,236,438,000 cubic feet, an increase of 96,522,000 feet, or 4·31 per cent. Of the quantity sold, 79·66 per cent. passed through ordinary meters, 9·98 per cent. through prepayment meters, 8·93 per cent. was used for public lighting, and 1·43 per cent. in works and offices. The revenue from the ordinary meters amounted to £183,459, an increase of £6818; but owing to the increase in discount of £7500, the net amount received was £680 less. In the prepayment meter rental there had been an increase of £3848. Owing to the reduction in the price of coke, the revenue had been reduced by £2211; but the labour had also decreased to the extent of £342. In the stoves department there had been an apparent loss on the year's working of £266. This was caused by the cost of the gas exhibition, which would, however, more than repay itself in the future by the increase in the consumption of gas, as they had now a total of 16,997 stoves on hire or sold, as against 14,517 last year.

The minutes were adopted.

GAS CHARGES AT BOLTON.

Position of Consumers by Prepayment Meters.

The Bolton Town Council, at their monthly meeting last Wednesday, spent some time discussing the question of making an alteration in the charge for gas to penny-in-the-slot meter consumers. The Committee had decided that they be in future charged 1d. for 27 cubic feet.

Mr. France moved, as an amendment, that the price be at the rate of 30 cubic feet for a penny in lieu of 25 feet as at present. He pointed out, in support of his amendment, that nearly 12,000 people were affected—the poorest section of the community; and he urged that they were not at present treated on an equitable basis. The price of gas, he said, was 2s. 6d. to ordinary consumers and 3s. 6d. to prepayment meter consumers—a difference of 42 per cent.; and he submitted that no honest argument could be advanced for any such disparity. It might be argued by the Gas Committee that the value of the meter should be taken into account; but this question was decided years ago, when it was agreed that the supply of the meter should be at the cost of the Corporation. It might also be said that extra labour was entailed with these prepayment meters; but he (Mr. France) denied that there was any, or very little indeed, because two-thirds of the meters were "drys," and only required monthly inspection. Robberies from these meters might likewise be adduced as an argument against the change to the reduced price; but he pointed out that during the past twelve months, though there had been 79 robberies in the borough, the loss was only £3 9s. What was more, the Gas Committee did not seem to be crediting the poor people with the advantage derived from cash payments. The speaker submitted figures to show that while in a number of towns around Bolton the average price of gas for ordinary consumption was 2s. 2¾d., in Bolton it was 2s. 4d.; and for prepayment meter consumers the average was 2s. 8¼d., against 2s. 9¼d. if his amendment was carried.

A long discussion followed. Mr. Heywood informed the meeting that there were 11,661 prepayment meters in use in the borough; and the cash received from them during the last twelve months amounted to £13,429. The average amount of gas used for each meter was 7000 cubic feet. What they proposed in reduction meant another £1020, which brought the extra cost down to less than £3000. The extra cost of prepayment meters above ordinary meters was £2857, which practically made the thing equal.

The Chairman of the Gas Committee (Mr. Webster) said that the price charged to the prepayment meter consumers was exactly the same as to the ordinary consumer, because there was the extra cost of the prepayment meters and repairs, which came to about 2½d. per 1000 cubic feet. The prepayment meters lasted about twelve years; the ordinary meters about thirty years. In the case of the former, a free griller was granted. Then it should not be forgotten that additional inspectors were required for prepayment meters, which, with wages and clothing, represented a considerable sum. Altogether the additional cost was 9d., so that there was no difference in the charges. Mr. Webster added—as another reason why there should not be any further concessions to gas consumers at present—that coal this year would cost them £2500 more than last year.

The amendment was lost by 57 votes to 6; but by a subsequent amendment the matter was referred back to the Committee for further consideration.

At last Friday's meeting of the Gas Committee, a letter was read from Mr. France requesting to be supplied with particulars as to the extra cost in connection with the supply of gas through prepayment meters, and also to be allowed to attend before the Committee. It was resolved that Mr. France be furnished with the information asked for, and that he be allowed to attend before the Committee as requested.

LISBURN GAS-WORKS PURCHASE.

The Umpire's Award.

In the last number of the "JOURNAL" (p. 343), we named the sum provisionally awarded by the Umpire (Mr. A. J. Ram, K.C.) in the arbitration proceedings in connection with the purchase of the Lisburn Gas-Works by the Urban District Council. The full text of the award has since been published. At the request of Counsel representing the two parties, it has been stated in the form of a special case; and the following are the terms.

It was contended before me by Counsel on behalf of the District Council as follows: (1) That although at the date of the notice to treat the undertaking was a non-statutory undertaking, and not subject to any legal restriction as to the amount of profit which could be divided, the Umpire and Arbitrators are bound to take into account the likelihood that the Company, if it had continued to exist, would have become a statutory Company, and to use their own judgment as to when that time would have arisen, and what restrictions, according to the practice of Parliament, would have been imposed; and (2) that, in fixing the purchase price, the maintainable profit as from that time should be taken at a sum not exceeding that which under statutory restrictions the shareholders would have been allowed to divide.

It was contended before me by Counsel on behalf of the Company that I ought not to have regard to the consideration set forth in the last preceding paragraph, but that in ascertaining the sum to be paid by the Council to the Company I ought to regard the maintainable profits of the Company existing as a non-statutory company.

The question for the opinion of the Court is as to which of the two contentions set forth in the two last preceding paragraphs is correct. If the Court is of opinion that the contentions put forward by Counsel for the Council are correct, and that I ought to take them into consideration, I find and award that the sum of £31,445 is the sum to be paid by the Council to the Company for the undertaking of the Company as defined in their Act. If the Court is of opinion that the contentions put forward by Counsel for the Company are correct, I find and award that the sum of £34,227 is the sum to be paid by the Council to the Company for the said undertaking of the Company so defined as aforesaid.

In the Gas Company's last published balance-sheet, its works, covered by the award, are returned at the value of £9733 7s. 5d. The amount offered by the Council before the arbitration was £24,000.

ELECTRIC LIGHTING DANGERS.

Fatality Caused by a Fused Wire.

Through the fusing of an electric wire, a disastrous fire occurred at a large drapery establishment in Church Street, Accrington, on Saturday week, the 30th ult. The premises, which were occupied by Messrs. Williams, Limited, employing 35 assistants, were gutted, and five people lost their lives—three female assistants and two lady customers. At the inquest last Wednesday, John Roberts, one of the shop assistants, stated that about a quarter to ten on the night in question, when the shop was crowded with customers, he heard the "clicking of the fuse" in one of the windows. He knew at once what had happened—it was an indication that the fuse was gone—and going to the window he found an electric wire on fire. He pulled the wire down; but before he had done so many articles in the window had been set on fire. Mr. Harold Gray, the Electrical Engineer to the Accrington Corporation, in his evidence, commented on the dangerous practice of putting flexible electric wires and lamps near inflammable material such as had been done in this case. He expressed the belief that in some shops goods were even pinned to the wires. After a long hearing, the Jury returned a verdict of "Accidental death."

The Town Council at Newport, Isle of Wight, have determined, at an estimated cost of £800, to replace the 6-inch water-main by a 10-inch main, in order to afford an adequate supply to the Royal Naval College at Osborne. There was some slight opposition to the proposal; but it was pointed out that unless the improvement was made £1500 a year would probably be lost by the Admiralty having a supply of their own, in which case the town water would run to waste.

PUBLIC LIGHTING OF THE CITY OF LONDON.

Annual Report of the City Engineer.

We have received from the City Engineer (Mr. Frank Sumner, M.Inst.C.E.) his report on the works executed by the Public Health Department of the Corporation of London during the year ending Dec. 31 last. It is of more than ordinary interest, inasmuch as (in addition to information usually furnished) it contains the text of the conclusions arrived at by the deputation of the Streets Committee who visited some of the most important of the Continental cities for the purpose of inspecting the various systems of public lighting in use, together with the tabulated particulars of the lighting there and in the City of London which constituted so valuable a feature of their report, which was reproduced in the "JOURNAL" for July 20, 1909.

ORDINARY AND HIGH-PRESSURE GAS LIGHTING.

The number of gas-lamps (including experimental lamps) paid for by the Corporation at the end of the year was 2720; being a decrease of 10 in the twelve months. The larger proportion of the ordinary burners (1978) consumed 4·25 cubic feet of gas per hour; the consumption of most of the high-pressure lamps being 10 and 20 cubic feet.

On Oct. 15, 1908, the Court of Common Council agreed to the proposal of the Gaslight and Coke Company to relight Fleet Street and Chancery Lane experimentally by means of 17 high-pressure inverted gas-lamps of the Keith type, on brackets fixed to the house fronts, projecting over the footpaths, in lieu of the 36 double-burner (upright) incandescent lamps on the footways and the two high-pressure lamps on rests at the eastern and western ends of the thoroughfare and opposite Fetter Lane. This change necessitated the laying down of a 6-inch high-pressure main in the centre of the roadway, with branch services to each lamp-post. The pressure—54 inches water gauge, or 4 inches of mercury—was obtained from the Company's power-house in Essex Street, Strand. The gas consumption per lamp is at the rate of 25 cubic feet per hour, with an illuminating power of 1500 candles; the inclusive annual upkeep of the lamps, with gas at 2s. 5d. per 1000 cubic feet, being £16 10s. each. This charge was reduced to £16 os. 10d. on the reduction in the price of gas in June, and further lowered to £15 2s. 6d. per lamp per annum at the Michaelmas quarter, when the price of gas was brought down from 2s. 4d. to 2s. 2d. per 1000 cubic feet; the Gas Company providing the necessary compressing plant, mains, services, brackets, and lanterns. The lamps, put into lighting on Dec. 24, 1908, were maintained during the year.

There are 102 other high-pressure Keith gas-lamps in the City thoroughfares; 42 upright single-burner lamps being fixed in the neighbourhood of Billingsgate on brackets. These lamps consume 10 cubic feet of gas per hour, and give an illuminating value of 300 candles each, at a cost of £6 13s. 6d. per lamp per annum. They are erected from 60 to 70 feet apart on the diagonal, at a height of about 12 feet from the pavement level, and are fixed to the house fronts; the roadway being about 50 to 60 feet wide. The lamps burn at 10 inches pressure from a special water-compressing plant placed in the adjacent pipe subway. The Corporation provided the compressing plant, services, lamp-brackets, and lanterns. In Queen Victoria Street, there are fixed 45 upright two-burner lamps, each consuming about 20 cubic feet of gas per hour, and giving a light equal to 600 candles; the cost per lamp being £12 per annum. The lamps are fixed on columns on the footpaths, about 100 feet apart on the diagonal. The burners are 13 ft. 6 in. above the pavement; the street being about 70 feet wide. The lamps burn at 10 inches pressure from a high-pressure trunk main direct from the gas-works. The Corporation provided the standards and lamps. There are also several other Keith high-pressure lamps, fitted with upright two, three, four, and six burners, on rests at the junctions of roadways, of 1000, 1300, 2000, and 3000 candles—making 119 in all.

During the year a trial was made of the Carpenter inverted burner lamp in Cheapside and Paternoster Row. Two double-burner lamps were fixed on the rests at the eastern and western ends of Cheapside, and a single-burner lamp at the corner of Paternoster Row and Warwick Lane, with satisfactory results. The consumption per burner is 4 cubic feet per hour; and the duty claimed is 120 candles per burner, or an illuminating value of 30 candles per cubic foot of gas.

The number of low-pressure gas-lamps at the end of the year was 2601, principally consuming 4½ cubic feet of gas per hour each; the illuminating power being 60 to 70 candles. Owing to the narrowness of the streets, the lamps are chiefly fixed on brackets from 60 to 70 feet apart on the diagonal, at a height of about 12 feet from the pavement level to the burner; the annual cost of each lamp, with gas at 2s. 2d. per 1000 cubic feet, being £3 5s. 7d., which includes maintenance of mantles, &c., but does not cover capital charges.

The number of defective gas-lights observed and reported upon during the year was 1841—viz., 1495 ordinary and 346 high-pressure lamps. The details of the lighting defects in the ordinary incandescent lamps were: Feeble lights, 1276; lights failed, 20—total, 1296. In addition, 199 defects in lanterns, burners, &c., were reported to the Gaslight and Coke Company and rectified. In accordance with the general instructions in force for many years past, the public gas-lamps were lighted whenever fog or unusual darkness occurred. This happened on 38 days during the year, and entailed an additional cost of £150 14s. 4d.

ELECTRIC LIGHTING.

The lighting of most of the main thoroughfares by arc lamps was continued throughout the year. The number of the original type of "open" electric lamps in lighting at the end of the year, at a cost of £26 each, was 366, or a decrease of 32, accounted for by the substitution of new and cheaper flame arcs in the following thoroughfares: Old Bailey, Ludgate Circus, Ludgate Hill, St. Paul's Churchyard, and the southern end of New Bridge Street; also by the discontinuance of the lamp at the junction of Gracechurch Street and Eastcheap, and that at the northern end of Blackfriars Bridge. In addition to this number, there were 63 "Oliver" flame arcs (partly experimental) and 18 "Reason" enclosed arcs (experimental) in lighting during the year. These lamps were lighted on 18 days when fog or unusual darkness occurred, at a total additional cost of £198 os. 5d. The number of defective electric lamps reported during the year was 52. For these failures, deductions were made from the accounts of the City of London

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 381.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
1,474,000	Stk.	Apl 1	5	Alliance & Dublin Ord.	80–82	−1	6 1 11
310,000	Stk.	July 14	4	Do. 4 p.c. Deb.	97–99	..	4 0 10
200,000	5	May 12	7	Bombay, Ltd.	6⅝–6¾	..	5 9 10
40,000	5	,,	7	Do. New, £4 paid	4⅞–5⅛	..	5 9 3
50,000	10	Feb. 25	15	Bournemouth Gas & Water: 10 p.c.	29–30	..	5 0 0
311,810	10	,,	7	Bournemouth Gas & Water: B 7 p.c.	16½–16⅝	..	4 3 7
75,000	10	,,	6	Bournemouth Gas & Water: Pref. 6 p.c.	15–15⅛	..	3 17 5
380,000	Stk.	,,	12½	Brentford Consolidated	252–255	..	4 18 1
330,000	,,	,,	9¾	Do. New	188–190	..	5 0 0
50,000	,,	Aug. 12	5	Do. 5 p.c. Pref.	120–122	..	4 2 0
206,250	,,	June 10	4	Do. 4 p.c. Deb.	99–101	..	3 19 3
220,000	Stk	Mar. 16	11	Brighton & Hove Orig.	214–217	..	5 1 5
246,320	,,	,,	8	Do. A Ord. Stk.	153–156	..	5 2 7
460,000	20	Apl. 1	10⅝	British	44–45	..	4 14 8
109,000	Stk.	Feb. 25	6	Bromley, A 5 p.c.	120–122	+1	4 18 4
165,700	,,	,,	4½	Do. B 3½ p.c.	90–92	+1	4 17 10
82,278	,,	,,	5½	Do. C 5 p.c.	107–109	+1	5 0 11
55,000	,,	June 29	3½	Do. 3½ p.c. Deb.	85–87	..	4 0 6
250,000	Stk.	June 29	4	Buenos Ayres 4 p.c. Deb.	7–99	..	4 0 10
100,000	10	—	—	Cape Town & Dis., Ltd.	3–4	..	—
100,000	10	—	—	Do. 4½ p.c. Pref.	5⅛–6⅛	..	—
50,000	50	May 3	6	Do. 6 p.c. 1st Mort.	49–50	..	6 0 0
100,000	Stk.	June 29	4½	Do. 4½ p.c. Deb. Stk.	88–90	..	5 0 0
157,150	Stk.	Feb. 25	5	Chester 5 p.c. Ord.	111–113	+2	4 8 6
1,513,280	Stk.	Feb. 25	5⅛	Commercial 4 p.c. Stk.	108–110	..	4 14 7
560,000	,,	,,	5	Do. 3½ p.c. do.	103–105	..	4 15 3
475,000	,,	June 29	3	Do. 3 p.c. Deb. Stk.	80–82	..	3 13 2
800 000	Stk.	June 10	5	Continental Union, Ltd.	90–92	+1	5 8 8
200,000	,,	,,	7	Do. 7 p.c. Pref.	135–137	..	5 2 2
492,270	Stk.	—	5½	Derby Con. Stk.	122–124	..	4 8 9
55,000	,,	—	4	Do. Deb. Stk.	104–105	..	3 16 2
148,995	,,	Apl. 1	5	East Hull 5 p.c. Ord.	96–98	..	5 2 0
486,090	10	July 14	12	European, Ltd.	23¼–24	−¼	5 0 0
354,060	10	,,	12	Do. £7 10s. paid.	17⅞–18⅛	..	4 18 8
16,179,445	Stk.	Feb. 10	4⅜	Gaslight and Coke Ord.	106–107	+½	4 7 2
2,600,000	,,	,,	3½	Gaslight and Coke 3½ p.c. max.	89–91	..	3 16 11
4,062,235	,,	,,	4	Gaslight and Coke 4 p.c. Con. Pref.	104–106	..	3 15 6
4,531,705	,,	June 29	3	Gaslight and Coke 3 p.c. Con. Deb.	80–82	..	3 13 2
258,740	Stk.	Mar. 16	5	Hastings & St. L. 3½ p.c.	93–95	..	5 5 3
82,500	,,	,,	6⅔	Do. do. 5 p.c.	117–119	..	5 9 3
70,000	10	Apl. 29	11	Hongkong & China, Ltd.	17–17⅛	..	6 5 9
131,000	Stk.	Mar. 16	7	Ilford A and C	145–147	..	4 15 3
65,780	,,	,,	5⅜	Do. B	109–111	..	4 19 1
65,500	,,	June 29	4	Do. 4 p.c. Deb.	98–100	..	4 0 0
4,940,000	Stk.	May 12	8	Imperial Continental	179–181	..	4 8 5
1,235,000	Stk.	Feb. 10	3⅜	Do. 3½ p.c. Deb. Red.	94–96	..	3 12 11
195,242	Stk.	Mar. 16	6	Lea Bridge Ord. 5 p.c.	122–124	..	4 16 9
561,000	Stk.	Feb. 25	10	Liverpool United A.	219–221	..	4 10 6
718,100	,,	,,	7	Do. B	164–165	−½	4 4 10
306,083	,,	June 29	4	Do. Deb. Stk.	104–106	..	3 15 6
75,000	5	June 29	6	Malta & Mediterranean.	4⅛–4⅜	..	6 4 8
560,000	100	Apl. 1	5	Met. of 5 p.c. Deb.	100–102	..	4 18 0
250,000	100	,,	4½	Melbourne 4½ p.c. Deb.	100–102	..	4 8 3
541,920	20	May 27	3½	Monte Video, Ltd.	12½–13	..	5 7 8
1,775,892	Stk.	July 28	4⅜	Newc'tle & G'tesh'd Con.	101–102*	..	4 5 9
529,435	Stk.	June 29	3½	Do. 3½ p.c. Deb.	89–91	..	3 16 11
55,940	10	Feb. 25	7	North Middlesex 7 p.c.	13¼–13⅜	..	5 1 10
300,000	Stk.	Apl. 29	8	Oriental, Ltd.	138–140	..	5 14 4
60,000	5	Apl. 1	8	Ottoman, Ltd.	6⅛–6⅜	..	6 3 1
31,800	53	Feb. 25	13	Portsea Island A.	134–136	..	5 1 0
60,000	50	,,	13	Do. B.	126–128	..	5 1 7
100,000	50	,,	12	Do. C.	119–121	..	4 19 2
114,800	50	,,	10	Do. D and E.	100–102	..	4 18 0
398,490	5	Apl. 29	7	Primitiva Ord.	7 1/16–7 1/16	..	4 14 1
796,980	5	June 29	5	Do. 5 p.c. Pref.	5⅝–5⅞	−⅛	4 13 0
488,900	100	June 1	4	Do. 4 p.c. Deb.	97–99	..	4 0 10
312,650	Stk.	June 29	4	River Plate 4 p.c. Deb.	97–99	..	4 0 10
250,000	10	Apl. 1	9	San Paulo, Ltd.	15⅞–16⅛	..	5 10 9
62,500	10	,,	6	Do. 6 p.c. Pref.	11⅞–12⅛	..	4 18 0
125,000	50	July 1	5	Do. 5 p.c. Deb.	49–50	..	5 0 0
135,000	Stk.	Mch. 16	10	Sheffield A	234–236	..	4 4 9
209,984	,,	,,	10	Do. B	234–236	..	4 4 9
523,500	,,	,,	10	Do. C	233–235	..	4 5 1
70,000	10	May 27	7	South African	11–11¼	..	6 1 9
6,429,895	Stk.	Feb. 10	5/9/4	South Met., 4 p.c. Ord.	122–124	+1	4 8 2
1,895,445	,,	July 14	3	Do. 3 p.c. Deb.	79–81	..	3 14 1
209,820	Stk.	Mar. 16	8	South Shields Con. Stk.	157–158	..	5 1 3
605,000	Stk.	Feb. 25	5⅜	S'th Suburb'n Ord. 5 p.c.	121–123	..	4 12 0
60,000	,,	,,	5	Do. 5 p.c. Pref.	121–123	..	4 1 4
117,058	,,	July 14	5	Do. 5 p.c. Deb. Stk.	120–122	..	4 2 0
502,310	Stk.	May 12	5	Southampton Ord.	110–112	..	4 9 3
120,000	Stk.	Feb. 10	7½	Tottenham A 5 p.c.	139–141	..	4 19 3
483,940	,,	,,	5¾†	Tottenham B 3½ p.c.	114–116	..	4 14 10
149,470	,,	June 29	4	Edmonton 4 p.c. Deb.	57–59	..	4 0 10
182,380	10	June 10	8	Tuscan, Ltd.	9–9¼	..	8 8 6
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	97–99	..	5 1 0
236,476	Stk.	Feb. 25	5	Tynemouth, 5 p c max.	113–115	..	4 6 11
255,636	Stk.	Feb. 25	6¾†	Wandsworth B 3½ p.c.	139–141	..	4 15 9
79,416	,,	June 29	3	Wandsworth 3 p.c. Deb. Stk.	73–75	..	4 0 0

Prices marked * are "Ex div." † Next dividend will be at this rate.

Electric Lighting Company, amounting during the year to £12 9s. 2d. The number of public electric arc lamps in use on Dec. 31 was 447; the prices charged being £12 10s., £17 10s., and £26 per lamp per annum, according to the kind of lamp.

EXPERIMENTAL ELECTRIC LIGHTING.

In accordance with the resolution of the Court of Common Council of July 25, 1907, whereby the two Electric Light Companies having statutory powers in the City were permitted to experiment with the newest form of electric lamps for street lighting in the thoroughfares of Holborn, Holborn Viaduct, part of Old Bailey, Farringdon Street, and Cannon Street (between St. Paul's Churchyard and Dowgate Hill), the Charing Cross and Strand Electricity Supply Company continued the lighting of their portion—viz., Cannon Street—with eleven magazine flame arcs centrally hung, being suspended over the roadway by wires attached to the buildings on either side at a height of 28 feet above the roadway. One lamp, at the corner of Dowgate Hill, was removed during the year, owing to the rebuilding of the premises there. These lamps are charged at the rate of £17 10s. per lamp per annum for the experimental period. The Charing Cross and Strand Company make this price conditional upon their having not less than 250 lamps to deal with. The City of London Electric Lighting Company also continued their experiment with 21 "Oliver" flame arcs in substitution of a similar number of the original "open" arcs, adapting the existing columns in Holborn, Holborn Viaduct, and part of Old Bailey 20·5 feet in height, while in Farringdon Street 18 enclosed arcs of the "Reason" type, fitted up on special short columns 14 feet in height in lieu of the 12 open arc lamps and columns in that thoroughfare, were maintained during the year. The installation of these two areas was completed by Nov. 20, 1907. The maintenance cost of the "Oliver" flame arcs in the Holborn area is £17 10s. each per annum—being equivalent to the charge for similar lamps in Cannon Street; and the cost of the enclosed arcs in Farringdon Street is £12 10s. each per annum.

Further Borrowing Powers for the Bury Corporation.—At a recent meeting of the Gas Committee of the Bury Corporation, it was resolved that application should be made to the Local Government Board for power to borrow £63,000 for gas-works purposes. On the minutes of the Committee containing the resolution being submitted for confirmation at the meeting of the Council last Thursday, Mr. Riley remarked that the amount seemed rather large, and he asked if the Committee had good and sufficient reason for asking for sanction to raise it. The Town Clerk explained that the money was required to meet expenditure during the next ten years on mains, cookers, and structural alterations; and it was anticipated that the amount named would be needed. Alderman Butcher remarked that the sum was less than that previously spent during a like period. Mr. Riley said the explanation was quite satisfactory. The minutes were confirmed.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

As will be seen from another column, the Corporation of Glasgow have not been long in bringing their new powers in the direction of differential prices into use. The proposed rates were criticized adversely in the Town Council, in the interest of a section of the community whose sponsors are not distinguished for the strict application of business principles to methods of promoting municipal enterprise. The policy of the Gas Committee being to promote the sale of gas by giving encouragement to the users to take more of it than they have been accustomed to, the unthinking devotees of class interests would, if we are to accept the dicta of Mr. Cook, who advocated their case, nullify the scheme by reducing it to the absurdity of giving greater advantages to those who scarcely use gas at all than to those whose increasing orders it was the object of the recent Act to secure. The Council are, as a whole, too level-headed to be influenced by such arguments as they were plied with; but they wisely—as they always do when a "man with a mission" urges them to do what would not be wise—listened to him patiently, and they then, following the lead of the Committee who had considered and brought forward the proposals, adopted them. The scale of charges, the Convener intimated, is only experimental, which makes the closer looking into the figures improper. It will be interesting to watch how the experiment results. On a scale of such magnitude, the lesson will probably be more striking than it would be in the case of smaller bodies. There is every reason to anticipate that the experience which the Corporation of Glasgow will obtain in the matter of differential rates will be, from the beginning, a happy one, and will prove an encouragement to them, and to others as well, to endeavour more than ever to popularize the use of gas.

Referring to the smoke abatement exhibition which is to be held in Glasgow from Sept. 16 to Oct. 8, a writer in the "Glasgow Herald" of last Tuesday states that the exhibition promises to be one of wide variety; and he goes on to remark that "the exhibition is intended as a means of bringing before the citizens in a practical and interesting fashion the latest and most scientific devices in connection with smokeless heating and lighting; and that the newest methods and contrivances for the complete combustion of fuel, as well as the most modern developments in heating, lighting, and ventilation by means of gas and electricity will be shown and explained." An extensive floor space is necessary for the thorough display of the exhibits; and the skating rink building in Victoria Road, which has an area of 30,000 square feet, will be utilized for the purpose. Floor spaces, varying in extent from 70 to 500 square feet, have been let to about 50 exhibitors from all parts of the country. The Gas and Electricity Departments of the Glasgow Corporation will provide interesting exhibits. Each department is fitting up a house, comprising dining-room, drawing-room, kitchen, bath-room, and laundry. The houses will each occupy an area of

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40 feet by 25 feet, and will be completely furnished. One will be heated and lighted by electricity and the other by gas. A number of smokeless fuels will be shown. There will be also a miscellaneous collection of gas-stoves, gas-fires, patent heaters, cookers, &c. Practical demonstrations of some of the appliances will be given daily. The Corporation will supply the gas or electric energy required by exhibitors for their stands free of charge. Among the firms to be represented at the exhibition are: John Wright and Eagle Range, Limited, the Richmond Gas-Stove Company, the Davis Gas-Stove Company, the Parkinson Stove Company, the Carron Company, Messrs. Fletcher, Russell, and Co., Wilsons & Mathiesons, Limited, R. & A. Main, George Bray and Co., Limited, James Milne and Son, Ewart and Son, and J. & W. B. Smith.

Regarding the gas transfer at Kirkcaldy, it is reported that last week Mr. Prosser, of Edinburgh, the Solicitor recently appointed by the Burgh in connection with the purchase of the gas undertaking, and Councillor J. Wright, the Convener of the Gas Committee, travelled to London, where they met Mr. Arthur Silverthorne, and afterwards conferred with representatives of the Gas Company with the purpose of discussing an amicable arrangement. As the Company had already intimated the nomination of their Arbiter, they could not go further into the matter meantime. Arrangements are being forwarded for the arbitration. The Oversman has not yet been appointed; and if the parties cannot agree, the appointment will be made by the Court of Session. A special meeting of the Town Council was held on Tuesday of this week, when the deed of nomination of Mr. Silverthorne as Arbiter for the Council in connection with the purchase of the gas undertaking was signed. Mr. Macindoe, the Town Clerk, reported that on July 25 he received from the Solicitors of the Gas Company a deed nominating Mr. Corbet Woodall as Arbiter for the Company, and that the Act confirming the town's Provisional Order received the Royal Assent on July 26.

The result of the year's trading in the Gas Department of the Grangemouth Town Council has been an increase to the net revenue account of £167, and an increase over the estimate of £194. The Gas Committee reported to the Town Council their satisfaction that the year's trading had more than covered the sinking fund payment of £800. As the price of coal had increased slightly since last year, and a further expenditure was to be met on the works, there might be a decreased profit this year, which meant that there would be no reduction in the price of gas. The report of the Committee was adopted.

The Cullen Gaslight Company have paid a dividend of 5 per cent. At the annual meeting of shareholders on Friday of last week, the Chairman reported that they had had a very satisfactory and prosperous year. The price of gas for lighting was reduced from 7s. 11d. to 7s. 6d. per 1000 cubic feet.

At the annual meeting of the Bo'ness Gas Company, Limited—ex-Provost Ballantine presiding—the Manager (Mr. J. Campbell) in his report stated that the make of gas for last year was almost 28 million cubic feet; being an increase of fully 1½ millions for the year. The new consumers numbered 118. The quantity of coal used was 103 tons less than before; and there were increased receipts from coke and tar. The usual dividend of 5 per cent. was declared.

Mr. W. Brown, who went from Lasswade to be Manager of the Cardenden Gas Company (a new undertaking), is finding business expanding in his hands. Intimation has been made that the Committee of Management of the special lighting district of Auchterduran have resolved to erect 152 street-lamps. The Committee have conferred with Mr. Brown as to the cost of erecting the lamps and supplying gas for the ensuing year, and have arranged that the Gas Company shall erect the lamp pillars and lanterns, with automatic lighting apparatus, for the sum of £4 4s. per lamp; the Committee to pay half of the wayleave charged by the Road Surveyor for the opening of the public roads. It has also been arranged that the Gas Company are to supply gas, mantles, and globes, and to do the cleaning of the lamps, their storage during the four summer months, and the lighting of them during the eight months of the year they are in use, for 32s. per lamp per annum—it being understood that the lamps are not to be lighted on nights when there is sufficient moonlight.

CURRENT SALES OF GAS PRODUCTS.

Sulphate of Ammonia. LIVERPOOL, *Aug.* 6.

Notwithstanding the intervention of the holidays, and the fact that new orders direct from consumers have not been abundant, the demand has continued good throughout the week, and a further improvement in prices has to be recorded. At the close, the quotations are £11 17s. 6d. per ton f.o.b. Hull, £12 per ton f.o.b. Liverpool, and £12 2s. 6d. per ton f.o.b. Leith. In the forward position, makers still demand a premium on prompt values, but no further transactions have transpired.

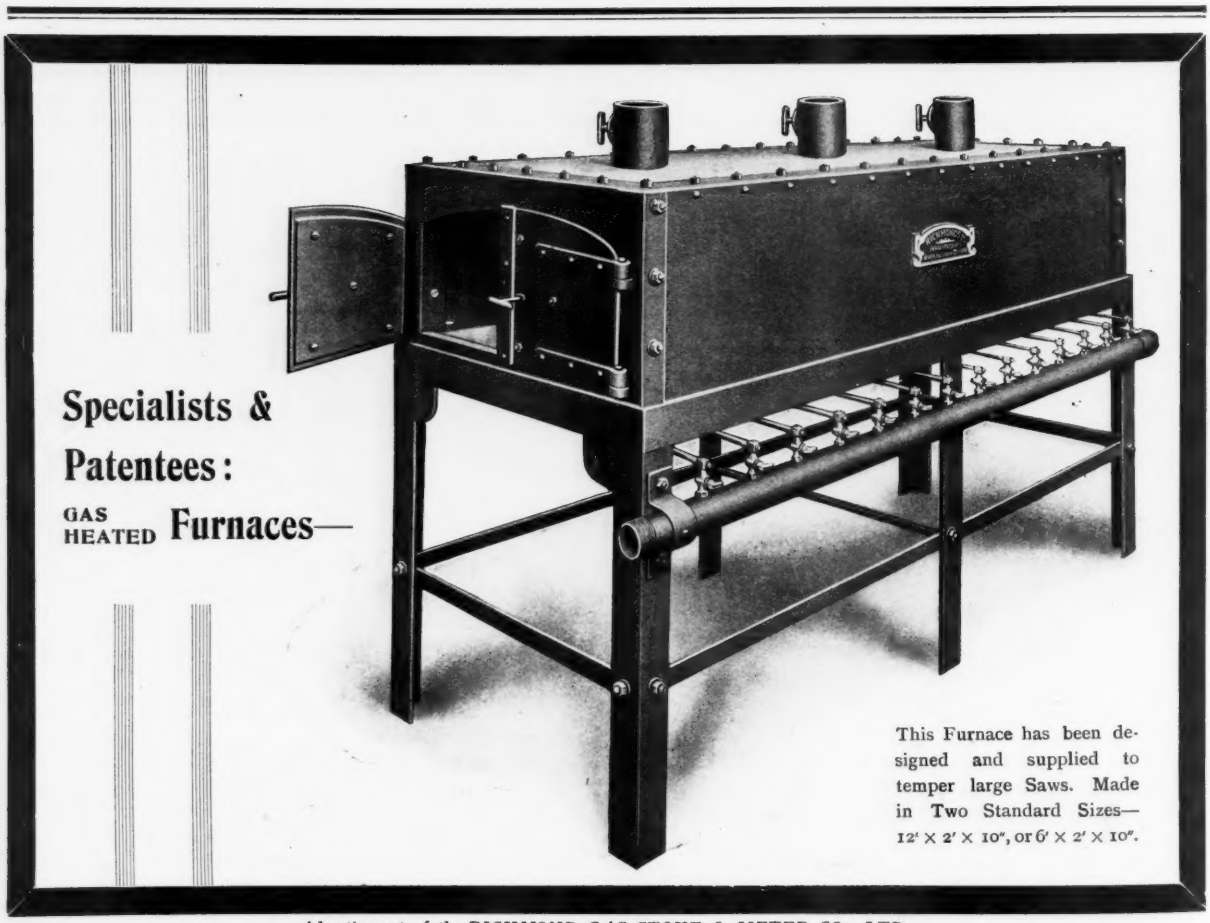
Nitrate of Soda.

There is no new feature to comment upon in the market for this article, and spot prices remain unchanged at 9s. 3d. per cwt. for 95 per cent. quality and 9s. 6d. for 96 per cent. quality.

Tar Products. LONDON, *Aug.* 8.

Business in tar products has been quiet during the past week; and pitch remains in about the same position. Prompt orders are scarce; and for the forward position, buyers seem to be able to hold out in the hope of obtaining lower prices. Benzols are steady; and distillers report that they are receiving a fair number of inquiries. In solvent naphthas, the inquiry has been slightly better during the week, and little business has been done at fairly good prices for delivery to the end of the year. Crude carbolic acid is of very little interest.

The average values during the week were: Tar, 15s. 9d. to 19s. 9d.,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Sulphate of Ammonia.

This article has fallen very flat again; and although in the majority of cases makers are asking high prices, it is not possible to do business at their quotations. Actual Beckton to day is quoted at £11 12s. 6d., and outside London makes £11 7s. 6d. In Hull, £11 16s. 3d. to £11 17s. 6d. is quoted; in Liverpool, £11 16s. 3d. to £11 17s. 6d.; and in Leith, £12 to £12 2s. 6d. for prompt and £12 5s. for forward. In Middlesbrough, £11 17s. 6d. is the figure.

COAL TRADE REPORTS.

Northern Coal Trade.

There has been rather more activity in the coal trade of the North, and the general demand appears to be stronger. In the steam coal trade, the output is well taken up, and prices are, on the whole, well maintained. Best Northumbrian steams are 10s. per ton f.o.b. For second-class steams, about 9s. is quoted; and for steam smalls, the price is from about 5s. 6d. to 6s. 6d. Exports appear to be a little heavier. In the gas coal trade, there is now a natural increase in the consumption. The shipments on the long contracts are growing more steadily; and the production is fairly full. For the usual classes of Durham gas coals, the prices vary from 9s. to 9s. 10½d. per ton f.o.b.; and for "Wear" specials, up to 10s. 6d. is the current quotation. In addition to a few sales for forward delivery, there are now contracts in the market for 130,000 tons of coals for the Naples Gas-Works, and of 17,000 tons for Padova; and the tenders for these two Italian contracts are expected to be soon decided upon. At the same time, there is a firmer tendency in the gas coal prices for forward delivery, which makes the settlement of contracts not so rapid, more especially when collieries have sold freely forward previously. In the coke trade, the demand is fair; but gas coke is now increasing in supply. Good gas coke is from 15s. 6d. to 15s. 9d. per ton f.o.b. in the Tyne.

Scotch Coal Trade.

Trade remains unchanged; the demand being barely equal to the supply for shipment. The season is, in fact, slack. The prices now quoted are: Ell, 8s. 9d. to 10s. 3d. per ton f.o.b. Glasgow; splint, 9s. 3d. to 9s. 6d.; and steam, 9s. to 9s. 3d. The shipments for the week amounted to 271,017 tons—an increase of 86,711 tons upon the previous week, and of 54,804 tons upon the corresponding week of last year. For the year to date, the total shipments have been 9,125,611 tons—an increase of 696,296 tons upon the corresponding period.

New Filter-Beds at Hereford.—At the meeting of the Hereford Town Council last Tuesday, it was decided to construct two extra sand filters adjoining the present filter-beds, which will treble the present filtering capacity, even when one of the beds is being cleaned.

North Sussex Gas and Water Company.—Readers of the "JOURNAL" are aware that a Receiver (Mr. A. W. Lunt) has been appointed of this Company. As he is at present engaged in carrying on the Ticehurst and District Water and Gas Company as Manager, a suggestion has been made that he should do the same in the case of the North Sussex Company, and endeavour to make it a success. Before anything can be done, the present Directors will be asked to resign; and Mr. M. J. Jarvis, the Solicitor of one of the shareholders, has invited the latter to attend a meeting, with the view of some concerted action being taken to recover some of the shareholders' money.

Stockport Gas Undertaking.—At the last monthly meeting of the Stockport Town Council, the Borough Treasurer's abstract of the various accounts of the Corporation for the year ended the 31st of March last was presented; and the Chairman of the Finance Committee (Alderman Henry Bell) offered a few observations upon it. Referring to the gas undertaking, he said it had again done well. The increase in the sale of gas was £542; but the sale of residual products was less by £1600. This, however, was more than counterbalanced by a saving of £2400 in coal. Out of the gas profits of £41,077, the usual depreciation had been allowed and interest paid; £3054 had been transferred to the reserve; and £18,000 had been granted in relief of the current year's rates.

York United Gas Company.—At the half-yearly general meeting of this Company last Wednesday, the Chairman (Mr. J. R. Hill) said the balance of profit for the six months ended the 30th of June was £8636, and they had received £381 interest on the reserve fund; making a total of £9017. The first charge on this sum was the interest on the debenture stock, amounting to £618; and there then remained a sum of £8399 to be dealt with. The Directors recommended that the usual maximum dividends at the rate of 4 per cent. per annum should be declared on the preference and ordinary stocks of the Company, which, after deduction of income-tax, would absorb £7910, and leave a surplus of £489 to be carried forward. The quantity of gas sold during the past half year showed an increase of upwards of 3¼ million cubic feet over that sold in the corresponding period of 1909. The Directors' report was adopted, and the dividends recommended were declared.

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New Joint-Stock Companies.—Combination Burners, Limited, has been registered with a capital of £2000, in 1750 preferred ordinary shares of £1 each and 5000 deferred ordinary shares of 1s. each, to carry on the business of gas, hydraulic, electric, motor, lighting, heating, ventilating, constructional, and general engineers, &c. The Lan Gas Coal Company, Limited, has been registered with a capital of £12,000, to carry on the business of colliery owners, coal owners, coal merchants, coke manufacturers, &c. Howellite Burners, Limited, is the title of a Company registered with a capital of £2000, in 10s. shares. The object is to carry on the business of manufacturers of, and dealers in, incandescent gas and other lights, fittings, and accessories, &c., and to adopt an agreement with H. Howell, of Balham, S.W.

Proposed Extensions at Salford Corporation Gas-Works.—At last Wednesday's meeting of the Salford Town Council, the report of a Special Sub-Committee of the Gas Committee, expressing the opinion that an extension of the gas-works is necessary, was approved. The question of applying for additional parliamentary powers for gas purposes was referred to the Gas Consultative Sub-Committee with power to add to their number; and the Chairman of the Gas Committee (Alderman Phillips), the Deputy-Chairman, and the Gas Engineer (Mr. W. W. Woodward) have been authorized to visit such cities and towns on the Continent as they may deem necessary for the purpose of inspecting new apparatus used in the manufacture of gas. It should be added that the report of the Special Committee sets out that an extension of the gas-works is imperative, and ought to be carried out at an early date.

Reduced Charges and Increased Consumption at Littleborough.—The accounts presented at the recent half-yearly meeting of the Littleborough Gas Company showed that the sales of gas for the six months ended the 30th of June produced £4419, compared with £4453 in the corresponding period of 1909. The decreased revenue was accounted for by the reduced price of 2d. per 1000 cubic feet, adopted last year. The quantity of gas sold in the six months was 31¼ million cubic feet, which was an increase of 3½ per cent. on the consumption in the first half of 1909; and residual products realized £1349, compared with £1277. The profit on the revenue account amounted to £1560; and there was a disposable balance of £3019. The working results for the twelve months ended the 30th of June showed that 6243 tons of coal were carbonized, producing 68⅜ million cubic feet of gas, or an average of 11,015 cubic feet per ton. The Chairman (Mr. J. C. Hudson) expressed the satisfaction of the Directors in presenting again a report which marked distinct progress on previous records, and revealed a satisfactory increase in sales of gas for all purposes, which he said had assisted them in meeting decreased revenue due to reduced charges. A dividend at the rate of 10 per cent. per annum, less income-tax, was declared. The shareholders expressed their satisfaction that the financial position of the Company was so sound; and thanks were accorded to the Directors, the Manager and Secretary (Mr. S. E. Halliwell), and the staff.

Wandsworth and Putney Gas Company.—At the half-yearly meeting of this Company next week, the Directors will report a profit of £16,435 for the six months ended the 30th of June. The amount available for distribution is £23,225; and the Directors recommend dividends at the rates of £8 5s., £6 15s., and £5 15s. 6d. per cent. per annum on the several classes of stock—increases of 2s.6d. and 1s. 9d. respectively as the result of the recent reduction in the price of gas. The make of gas in the half year was 583,063,000 cubic feet, of which 547,322,000 feet were sold, and 554,027,000 feet accounted for.

Malton Gas Company.—The amount available for distribution as the result of the working of the Malton Gas Company in the six months ended the 30th of June was £3246; and at the recent ordinary general meeting it was decided to pay a dividend of 6 per cent. for the half year, free of income-tax. After payment of this, there remained £1806 to be carried forward. The reserve fund was increased to £7100. In seconding a vote of thanks to the Chairman and Directors, Mr. Moorhouse spoke of the excellent management of the Company. He said the fact that with a revenue account of about £5000 for the half year the bad debts only amounted to 7s. 4d. spoke eloquently for the management and for the commercial honesty of the community.

Prospective Water-Rate for London.—Before the close of the year, London will in all probability be faced with yet another rate. At the last meeting of the Finance Committee of the Metropolitan Water Board, says the "City Press," the question of the immediate issue of a precept was discussed; and directly the holidays are over, the Committee will again have the question before them. There can be little doubt that the result will be the issue of a demand to the various rating authorities in London and the outer area served by the Water Board. The position of the Board is serious, so far as finance is concerned. The Charges Act has failed to provide a sufficient income, despite the huge demands of the Board in the central district of London. During the six-and-a-half years of the existence of the Board, the deficiency has reached £136,000. Probably the new rate will be fixed at ¼d., unless the Board adopt the principle of levying an occasional rate.

Water Scheme for the Clown Rural District.—A Local Government Board inquiry was conducted at the Clown Co-operative Hall last Friday, by Mr. A. W. Brightmore, into an application by the Clown Rural District Council for power to borrow £5674, £12,494, £13,859, and £9473 for purposes of water supply for the parishes of Clown, Creswell, Barlborough, and Whitwell respectively, including the provision of reservoirs at Speetley Plantation, Barlborough, and Sparken Hill, Worksop, with capacities of 400,000 and 150,000 gallons respectively, and the execution of other works in the urban district of Worksop. There was a good deal of opposition to the scheme, which has been approved by Mr. Hodson, the Water Engineer to the Council. The cost of the joint works will be £25,500, and of the actual scheme £41,500. The annual cost will be £3472, which works out at 7½d. per 1000 gallons; and the water will be supplied at 10d. per 1000 gallons.

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Cambridge Corporation and the Water Company.

In the course of a highly satisfactory report presented by the Directors of the Cambridge Water Company at the recent half-yearly meeting, they recommended the payment of dividends for the six months ended the 30th of June at the rates of 10 and 7 per cent. per annum on the two classes of consolidated stock, less income-tax. Referring to the Bill promoted by the Company, they stated that it had been before Select Committees of the Houses of Lords and Commons. Before the House of Lords Committee, it was opposed by the Cambridgeshire County Council, the Cambridge Corporation, Trinity College, and others. But when it came before the Committee of the House of Commons, there remained only one opponent—viz., the Corporation of Cambridge, who desired to have inserted a clause providing that in the event of the Corporation introducing a Bill next session to purchase the Company's undertaking, and such Bill becoming law, the powers conferred upon the Company by their Act should not be deemed to increase the value of the undertaking. But the clause asked for was refused. With regard to the quality of the water, the Directors stated that they continued, through Professor Sims Woodhead, to keep a constant watch on its bacteriological quality, and through Mr. E. F. Smith on its chemical character. The Engineer and Manager (Mr. W. W. Gray) reported that during the past half year water had been laid on to 112 premises, the rental from which would be £161 per annum, and that the total number of premises now supplied was 18,675; also that the general condition of the Company's works was satisfactory. The dividends recommended were declared.

Co-Partnership at Grantham.—At the half-yearly meeting of the Grantham Gas Company, the Directors were able to present a very satisfactory statement, showing a balance of £3495 to the credit of the profit and loss account. Out of this sum, they recommended that £2000 should be applied in payment of the maximum dividend of 5 per cent. per annum on the consolidated stock, and that the balance of £1495 be carried forward. The result of the past year's working, they said, fully justified the course taken by them in reducing the price of gas last year. From the increased consumption, it was proved that this step had been duly appreciated by the consumers. The co-partnership scheme with the employees had been working smoothly and successfully, and was much in favour with the men, who earned £116 during the past year. In moving the adoption of the report, the Chairman (Mr. J. G. Thompson) said he thought they would agree that the accounts were thoroughly satisfactory. Referring to the co-partnership scheme, he pointed out that during last year the men earned 3½ per cent. on their wages. In the current half year, in consequence of the reduced price of gas, they would earn 5 per cent. If in future the Directors were able to still further lower the charge for gas, the men would proportionately benefit. The report was adopted.

APPLICATIONS FOR LETTERS PATENT.

17,575.—Cross, F. L., "Operating recording apparatus in gas distributing systems." July 25.
17,623.—Baldwin, W. J., "Separating dust and other materials from gases." July 25.
17,667.—Harris, W. A., and Jackson, J., "Gas-engine fault-detector." July 26.
17,712.—Trimlett, H. J., "Gas-pressure alarm apparatus." July 26.
17,728.—Freytag, E. E., and Alexander, E. K., "Gas-turbines." July 26.
17,732.—Jones, A. O., "Improvements in coke." July 26.
17,760.—Doulton, H. L., and Morris, C. E., "Pipe-joints." July 26.
17,766-7.—Southey, A. W., "Generation of gaseous fuel." July 26.
17,779-80.—Withers, J. S., "Gas-heaters." A communication from E. G. van Zandt. July 26.
17,781.—Withers, J. S., "Gas-burners." A communication from E. S. van Zandt. July 26.
17,807.—Cotterell, E. H., "Two-cycle gas-motor." July 27.
17,881.—Withers, J. S., "Gas-burners for heating apparatus." A communication from E. G. van Zandt. July 27.
17,888.—Adamson, R. A., "Scraping and cleaning water-mains." July 27.
17,900.—Madeley, J. W., "Automatic regulation of the flow of liquid through pipes." Partly communicated from E. P. Richards. July 27.
17,902.—Belshaw, T. O., "Adjustable reflector for artificial light." July 27.
17,923.—Lucas, H., and Egginton, W. H., "Acetylene generators." July 28.
17,931.—Crossley, K. I., and Webb, W. Le P., "Internal-combustion engines." July 28.
17,949.—Bolz, C., "Distilling ovens with upright retorts." July 28.
17,985.—Nicholson, T., "Separators." July 28.
18,000.—Wirtz, J., and Hinne, F., "Kindling and extinguishing street-lamps and the like." July 28.
18,016.—Berlin Anhaltische Maschinenbau-Act.-Ges. Abteilung Köln-Bayenthal, "Gas-purifiers." July 28.
18,051.—Watson, J., "Automatic meter and indicator." July 29.
18,057.—Williams, J., "Air-gas apparatus." July 29.
18 084.—Bagrachow, G., "Impregnating mantles." July 29.
18,130.—Docking, A., "Supplying a mixture of gas and air." July 30.
18,143.—Whitfield, C., "Gas-producers." July 30.
18,148.—Burstall, F. W., "Treating carbonaceous substances." July 30.
18,176.—Wilton, G., "Treatment of gas." July 30.
18,199.—Carr, H. O., and Nairne, U. O. S., "Testing the illuminating power of gas." July 30.
18,201.—Emanuel, P. A., "Gas-making apparatus." July 30.
18,202.—Friedrichs, L., "Safety device for gas-cocks." July 30.

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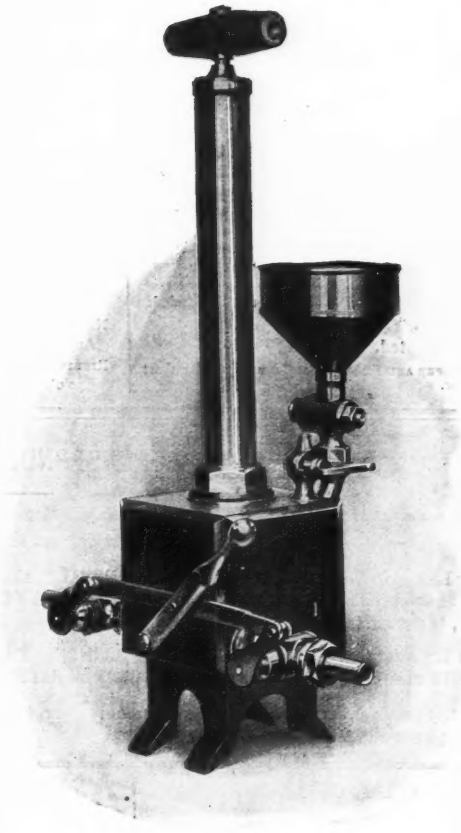

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Brighton and Hove Gas Bill.—The East Sussex County Council have accepted without comment the report of their Brighton and Hove Gas Bill (1910) Committee, who stated that, as the result of their opposition, the County Council were successful in obtaining protection on the question of the control of the depth of pipes and on that of the reinstatement of the roads. The promoters also abandoned a clause which would have had the effect of enabling them to open up the main roads of the county for the purpose of laying pipes for procuring, conducting, or disposing of any oil or other materials used by them in, or resulting from, any manufacture of gas or residual products.

The Directors of the Derby Gaslight and Coke Company at their meeting last Wednesday declared an interim dividend at the rate of 5 per cent. per annum on the consolidated stock for the half year ending June 30.

At the quarterly meeting of the Forsbrook Parish Council, a letter was read from the Clerk to the Stoke County Borough Council saying that, in response to the Parish Council's request, the Gas Committee had recommended a reduction in the price of gas for the Blythe Bridge district, to 2s. 10d. per 1000 cubic feet, with a discount of 3d. for payment on demand. This was considered satisfactory.

The Lilleshall Company, Limited, of Oakengates, have recently received an order from the United Alkali Company, of Widnes, for a double-acting gas-engine, which will be direct-coupled to a compressor to compress the limekiln gases used in the chemical works. The compressor cylinder is connected to the two tandem gas-cylinders, and will be fitted with automatic frictionless valves. The output will be 1820 cubic feet of gas per minute, compressed to 40 lbs. per square inch.

The electric current suddenly failed last Friday evening at Bridlington, and the town was plunged into darkness. The shopkeepers who were dependent upon it had to resort to candles. On the Royal Prince's Parade, where 7000 people were assembled, the illuminations and lights went out in the middle of the performances. In the Floral Pavilion, the municipal orchestra were playing when the current failed; but they continued in the dark, to the great admiration of the crowd, and possibly to the avoidance of panic.

The Gas Committee of the Stockport Corporation have accepted a tender from Messrs. Gibbons Bros., Limited, of Dudley, for settings of inclined retorts for £7150.

The Southampton Borough Council have agreed to a proposal that, as electric mains are laid in roads, the public lamps shall be connected with them. The Mayor (Alderman C. J. Sharp) remarked that, as they owned the electricity undertaking, they should support it as much as they could; and he would like to see the whole town lighted by electricity. The Electrical Engineer had previously reported that in most cases the revenue obtained by the public lighting would cover the interest and sinking fund charges on the main.

At the Wrexham Gas-Works last Friday evening, prizes were distributed for the best kept garden plots. In handing over the prizes, Mr. J. Braithwaite, the Engineer and Manager of the Company, highly complimented the men on the successful crops resulting from the care and attention given to the plots. There were altogether six prizes—two were given by Mr. J. Oswell Bury, the Managing-Director, three by Mr. Braithwaite, and one by Mr. George Roberts, to whom a hearty vote of thanks was accorded at the termination of the proceedings.

In an attractive booklet bearing the title of "The Light Within," the Block Light Company, Limited, of Manchester, furnish particulars of a new American four-light inverted gas "arc" lamp which they are putting on the English market. It has been specially constructed for lighting large business establishments, factories, railway stations, and other places; and it is claimed that, with a consumption of 14 cubic feet of gas per hour, it will give a light equal to 600 candles. Other claims put forward by the makers of the lamp are its attractive appearance, simplicity of working, and facility of application.

The Dowson and Mason Gas Plant Company, Limited, has been formed to combine the business of the Dowson Economic Gas and Power Company, Limited, of London, with that of the Mason Gas Power Company, Limited, of Manchester. The Dowson plants will still be used for engine work, and the Mason furnaces and producers for furnace work. The works of the combined Company will be at Levenshulme, Manchester; and the London office will be continued at No. 39, Victoria Street, Westminster. Mr. Dowson will act as Engineer and Managing-Director of the combined business.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

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Meetings.

BARNET GAS AND WATER COMPANY. Holborn Restaurant, Aug. 29, 12.30 o'clock.
BRIGHTON AND HOVE GAS COMPANY. London Offices, Aug. 25, Two o'clock.
ENFIELD GAS COMPANY. Offices, Aug. 30, 5.30 o'clock.
HORNSEY GAS COMPANY. London Office, Aug. 19, 3.30 o'clock.
NORTH MIDDLESEX GAS COMPANY. London Offices, Aug. 22, 2.30 o'clock.
RIDDINGS GAS COMPANY. London Offices, Aug. 29, 3.30 o'clock.

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WANTED, immediately, Two or Three
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Apply, by letter, Stating Age, Qualifications, and Salary required, to No. 5268, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

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Energetic REPRESENTATIVE required to call on Manufacturers requiring these Appliances. Must have had Experience, also fair knowledge of Drawing.
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Apply, by letter, stating Age, Experience, and Salary required, to No. 5272, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED, by the Mitcham and
Wimbledon District Gaslight Company, Experienced SHOW-ROOM ATTENDANTS. Must be capable Salesmen of Good Address, with a thorough knowledge of all Descriptions of Gas Appliances.
Apply, by letter, giving full Particulars of Qualifications, Age, and Salary required, to the Manager, Gas-Works, Mitcham.

CAMBRIDGE UNIVERSITY AND TOWN GASLIGHT COMPANY.
WANTED, by the above Company, an
ASSISTANT to the Engineer.
Applications, stating Salary Expected, Qualification, and Experience, with *copies* of Testimonials, to be addressed to Jas. W. Auchterlonie, Engineer and Manager, Gas Company's Offices, Cambridge.

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Sealed Tenders, endorsed "Tender for Oxide," addressed to the Chairman of the Gas Committee, Town Hall, Salford, to be delivered to me not later than Three p.m. on Thursday, the 25th of August, 1910.

L. C. EVANS,
Salford. Town Clerk.

HORNSEY GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of this Company will be held at the Offices of the Company, No. 63, Chancery Lane, in the County of London, on Friday, the 19th day of August, 1910, at Half-Past Three o'clock in the Afternoon precisely, to receive the Report of the Directors and the Accounts for the Half Year ended the 30th of June last; to declare Dividends; and to transact the Business of an Ordinary General Meeting.

The TRANSFER BOOKS WILL BE CLOSED from the 5th to the 19th of August, 1910, both days inclusive.

By order of the Board,
WILLIAM E. ROBERTS,
Secretary.

Offices: 63, Chancery Lane,
London, W.C., Aug. 2, 1910.

NORTH MIDDLESEX GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Company will be held at the Company's Offices, No. 5, Great Winchester Street, Old Broad Street, in the City of London, on Monday, the 22nd day of August inst., at Half-past Two o'clock p.m., to receive the Report of the Directors and the Accounts of the Company for the Half Year ended the 30th of June, 1910; to declare Dividends; and for other Purposes.

The TRANSFER BOOKS of the Company WILL BE CLOSED from the 9th to the 22nd of August, both days inclusive.

ERNEST L. BURTON,
Secretary.

Secretary's Office: 5, Great Winchester Street,
Old Broad Street, London, E.C.,
Aug. 5, 1910.

BARNET DISTRICT GAS AND WATER COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of the above Company will be held at the Holborn Restaurant, 218, High Holborn, London, W.C., on Monday, the 29th day of August, 1910, at Half-Past Twelve o'clock in the Afternoon precisely, to receive the Report of the Directors and the Accounts for the Half Year ended the 30th day of June last; to declare a Dividend; and to Transact the General Business of the Company.

The TRANSFER BOOKS WILL BE CLOSED from the 16th to the 29th of August, both inclusive.

By order of the Board,
ERNEST W. DREW,
Secretary.

Offices: 6 & 7, Queen Street,
Cheapside, London, Aug. 5, 1910.

ENFIELD GAS COMPANY.

NOTICE is Hereby Given, that the HALF-YEARLY ORDINARY GENERAL MEETING of the Proprietors of this Company will be held at the Offices of the Company, Sydney Road, Enfield, on Tuesday, the 30th day of August current, at Half-Past Five o'clock in the Afternoon precisely, to receive the report of the Directors and the accounts of the Company for the Half Year ended the 30th of June last; to declare a Dividend; and to Transact the General Business of the Company.

The TRANSFER BOOKS WILL BE CLOSED from the 17th to the 30th of August, both inclusive.

By order,
CHAS. W. OFFORD,
General Manager and Secretary.

Enfield, Aug. 4, 1910.

RIDDINGS DISTRICT GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY MEETING of the Shareholders of the above Company will be held at the Offices of the Company, Nos. 6 & 7, Queen Street, Cheapside, in the City of London, on Monday, the 29th day of August, 1910, at Half-Past Three o'clock in the Afternoon, to receive the Report of the Directors and the Accounts for the Half Year ended the 30th day of June last; to declare a Dividend; and to Transact the General Business of the Company.

The TRANSFER BOOKS WILL BE CLOSED from the 16th to the 29th inst., both inclusive.

By order of the Board,
ERNEST W. DREW,
Secretary.

Offices: 6 & 7, Queen Street,
Cheapside, London, Aug. 5, 1910.

BRIGHTON AND HOVE GENERAL GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors will be held at the Company's Offices, No. 5, Great Winchester Street, Old Broad Street, in the City of London, on Friday, the 26th of August, 1910, at Two o'clock p.m., precisely, to receive the Report of the Directors and the Accounts of the Company for the Half Year ended the 30th of June, 1910; to declare Dividends; to elect Auditors; and for other Purposes.

The TRANSFER BOOKS of the Company WILL BE CLOSED from the 13th to the 26th of August, both days inclusive.

ERNEST L. BURTON,
Secretary.

5, Great Winchester Street,
Old Broad Street, London, E.C.,
Aug. 4, 1910.

THE Proprietors of the Patents Nos. 7188, of 1901, for "IMPROVEMENTS IN, OR RELATING TO, ACETYLENE GAS-LAMPS OR GENERATORS;" 11,612, of 1902, for "ACETYLENE GAS-LAMPS FOR TABLE USE;" 23,629, of 1903, for "IMPROVEMENTS IN ACETYLENE GAS-GENERATORS;" 10,185, of 1905, for "IMPROVEMENTS IN ACETYLENE GAS GENERATORS," are desirous of entering into Arrangements, by way of LICENSE and Otherwise, on Reasonable Terms, for the purpose of EXPLOITING the same and ensuring their Full Development and Practical Working in this Country. All Communications should be addressed in the first instance to HASELTINE, LAKE, & Co., Chartered Patent Agents and Consulting Engineers, 7 & 8, Southampton Buildings, Chancery Lane, LONDON, W.C.

THE Proprietor of the Patent No. 17,580, of 1904, for "IMPROVED METHOD OF TREATING COAL FOR COKING PURPOSES," is desirous of entering into Arrangements by way of LICENSE and otherwise, on Reasonable Terms, for the purpose of EXPLOITING the same and ensuring its Full Development and Practical Working in this Country. All Communications should be addressed in the first instance to HASELTINE, LAKE, AND Co., Chartered Patent Agents and Consulting Engineers, 7 & 8, Southampton Buildings, Chancery Lane, LONDON, W.C.

THE Proprietor of the Patent No. 19,799, of 1907, for "IMPROVEMENTS RELATING TO GENERATORS FOR ACETYLENE GAS OR THE LIKE," is desirous of entering into Arrangements, by way of LICENSE and otherwise, on Reasonable Terms, for the purpose of EXPLOITING the same and ensuring its Full Development and Practical Working in this Country. All Communications should be addressed in the first instance to HASELTINE, LAKE, AND Co., Chartered Patent Agents and Consulting Engineers, 7 & 8, Southampton Buildings, Chancery Lane, LONDON, W.C.

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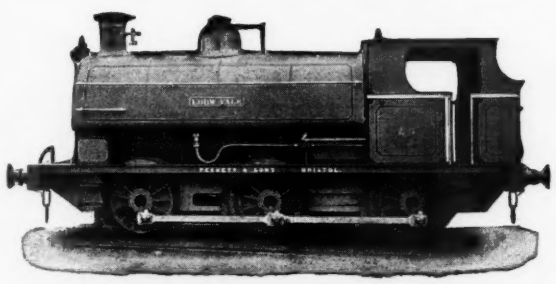

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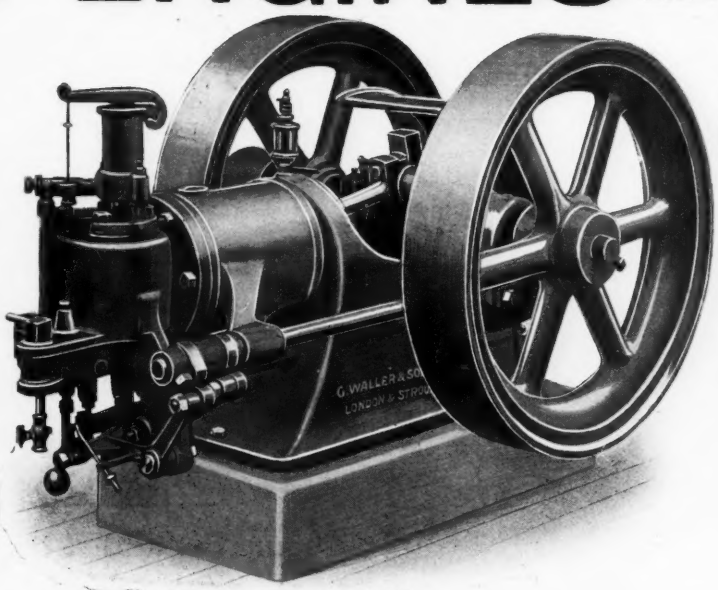

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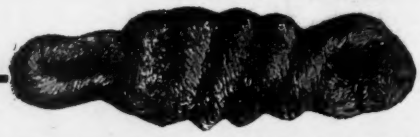

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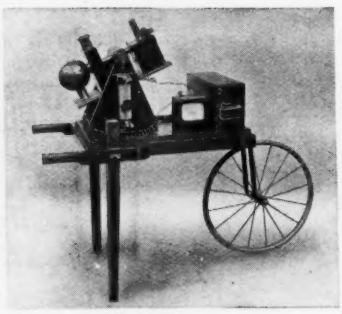

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Undernoted we give a Table of Analysis and Physical Characteristics of a sample of Glenboig Fire-Clay by J. T. Norman, London; and, in submitting a report from a responsible and reliable public analyst, we would here draw attention to the unreliable character of some recently published analyses where a manufacturer selects not only his own samples, but also those of his competitor, and has them treated by a private analyst. SUCH STATEMENTS ARE ALTOGETHER UNTRUSTWORTHY.

ANALYSIS OF GLENBOIG FIRE-CLAY.

By JOHN T. NORMAN, Esq., F.C.S., &c., The City Central Laboratory, LONDON.

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23, Leadenhall Street,
London, E.C., September 21st, 1909.

Dear Sirs,

I have completed the investigation of the samples of Clay received from you on the 10th inst., and now beg to report the results.

CHEMICAL ANALYSIS.

	Raw.	Fired.
Silica, free	3·03	3·49
Silica, combined	43·20	49·77
Alumina	36·55	42·10
Ferric oxide	1·80	2·08
Titanic oxide	1·30	1·50
Lime	trace	trace
Magnesia	trace	trace
Alkaline oxides	trace	trace
Sulphates as trioxides	0·92	1·06
Loss on Ignition	13·20	—
	100·00	100·00

PHYSICAL RESULTS.

Density	2·65
Volume weight	1·90
Porosity	15·4 %
Linear shrinkage at 100° C.	3·70%
,, ,, ,, 1050° C.	4·76%
,, ,, Total	8·46%
Volume shrinkage at 100° C.	10·7 %
,, ,, ,, 1050° C.	12·6 %
,, ,, Total	23·3 %
Plasticity	20·0 %
Fire Stability	1850° C. equiv. 3362° F. (SEGER CONE 36.) (New Scale CONE 38.)

(Signed) J. T. NORMAN.

This Clay is remarkable for its high percentage of Alumina and for the almost complete absence of ingredients tending to lower the refractory properties; its fire stability is extremely high. For some years past I have been urging clients who are working the Clays of the Coal Measures to search for such a material, but you are the first to discover a supply. The possession of this Clay places you in a unique position amongst the manufacturers of refractory goods throughout the world, and I have no doubt will, if duly exploited, enable you to drive out of the market the large quantities of foreign fire-bricks which are being poured into this country for use in the construction of bye-product ovens and for other purposes.—I am, yours faithfully,

JOHN T. NORMAN.

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in their own District
At **HIGHER PRICES**
By Adopting the **COALEXLD PROCESS.**
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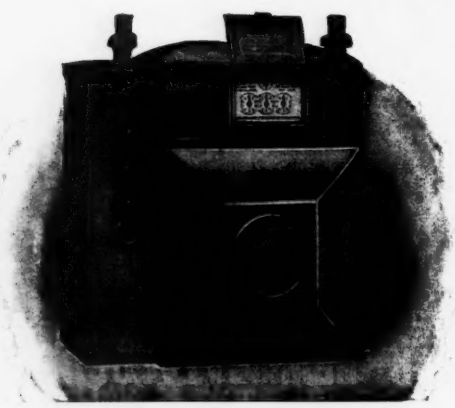

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Inverted Arc Lamp, Fig. 623.

Storm Proof—
For Exterior Lighting.

Welsbach-Kern
(Patent) Inverted System

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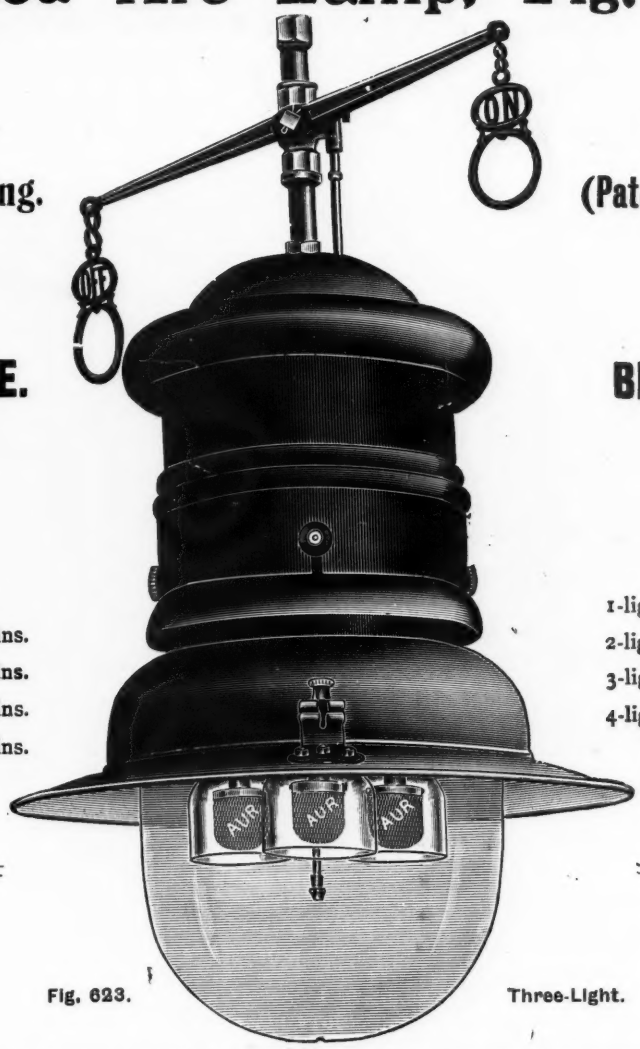

Fig. 623. Three-Light.

Height over all.

1-light . . .	1 ft. 8 ins.
2-light . . .	2 ft. 4 ins.
3-light . . .	2 ft. 4 ins.
4-light . . .	2 ft. 7 ins.

Width over all.

1-light . . .	1 ft. 1 in.
2-light . . .	1 ft. 5 ins.
3-light . . .	1 ft. 5 ins.
4-light . . .	1 ft. 8 ins.

ENAMELLED Green Steel Casing, fitted with Welsbach-Kern Inverted Burners, Gas and Air Regulators operated from outside. Sliding Door to give access to Burners for cleaning purposes. Fitted with Magnesia Nozzles, Welsbach Mantles, and Glass Mantle Protectors. Complete as shown. Highly efficient and regenerative.

	Gas per hour.	*C.P.*	*Steel.*	*Copper Case.*		*Gas per hour.*	*C.P.*	*Steel.*	*Copper Case.*
1-light	4 feet	125	**30/-**	**5/-** extra.	3-light	12 feet	400	**52/6**	**6/-** extra.
2-light	8 feet	260	**47/6**	**6/-** extra.	4-light	16 feet	550	**72/6**	**9/-** extra.

All on or off, or One light on and the rest off, **7/6** per Lamp extra. Cup and Ball, **3/6** per Lamp extra.

RENEWALS.

Glass Mantle Protectors (Fig. 623) **3/4½** per dozen, or in case lots of 5 gross, **33/-** per gross.

	1-Light.	*2-Light.*	*3-Light.*	*4-Light.*		*1-Light.*	*2-Light.*	*3-Light.*	*4-Light.*
Clear Glass Globes, each	**2/3**	**5/9**	**5/9**	**9/-**	Wired Globes, extra each	**2/-**	**2/-**	**2/9**	**3/6**
" " " In Case lots per dozen.	**19/6**	**57/9**	**57/9**	**93/-**	Parabolic Reflector, extra "	**3/6**	**6/-**	**7/6**	Not made
Case contains . .	*80*	*18*	*18*	*12*	Welsbach Mantles, each **6d.** subject as usual.				

The Welsbach Mantles for Upright lighting are "C," "CX," and "Plaissetty," price **4½d.** each.

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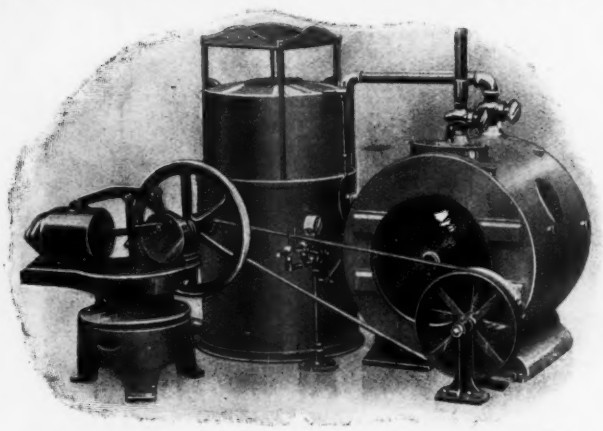

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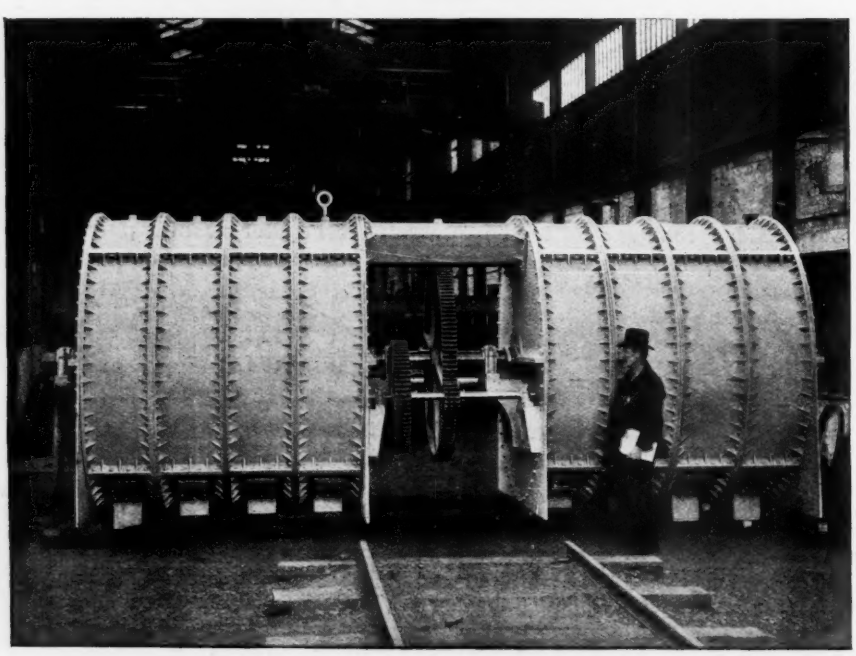

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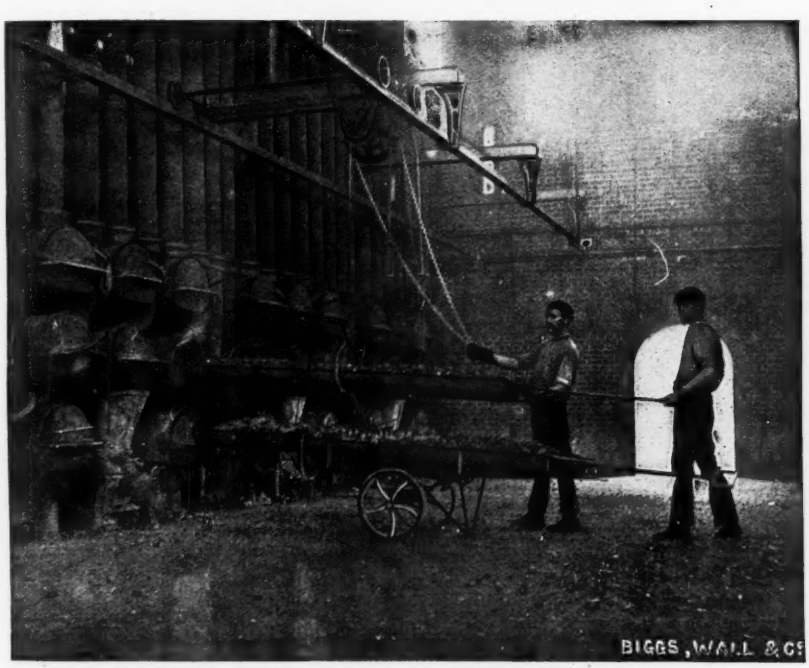

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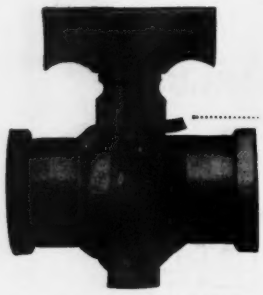

Fig. 1. The Old Style with the Old Trouble.
Note the Pin **A.**

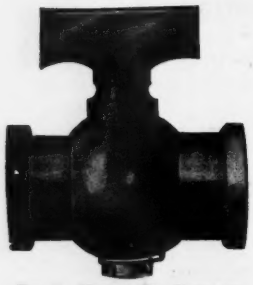

Fig. 2. **Evered's Patent "Safety Stop."** No Pin, No trouble.

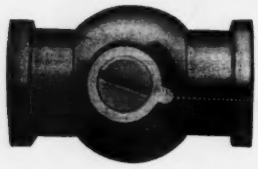

Fig. 3. Underside showing "Safety Stop" in lieu of Pin.

EVERED'S PATENT "SAFETY STOP."

Buyers of Gas Fittings are familiar with the trouble constantly arising through the Stop Pin of the Tap or Cock getting bent or broken, or falling out, thus leaving the Tap without a Stop, and leading to great danger of an escape of Gas.

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The projection shown in Fig. 3, marked **B,** working in the recess shown in Block, allows the Tap to be turned only so far as the recess extends. There is no possibility of the Tap turning further round as there is no Pin to become displaced or broken.

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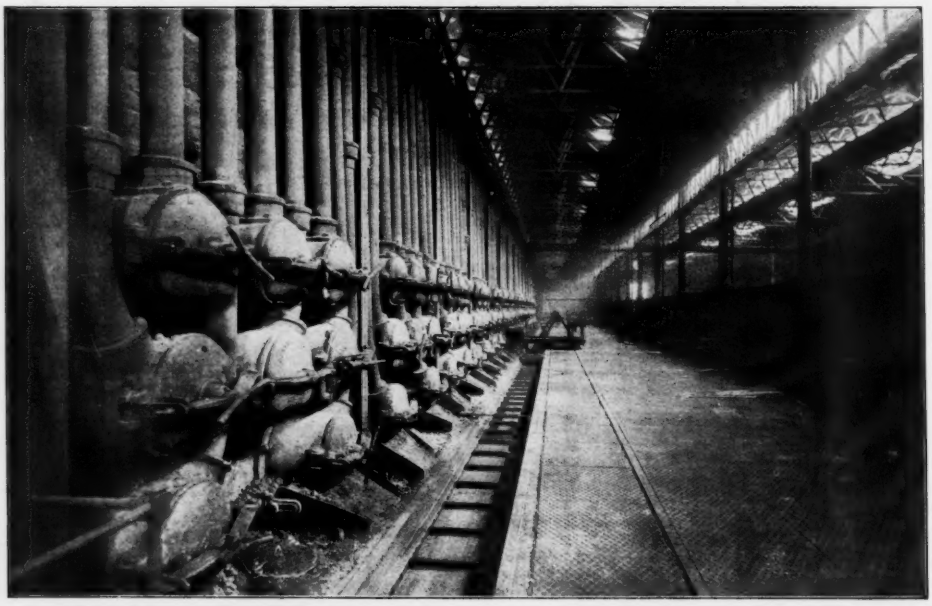

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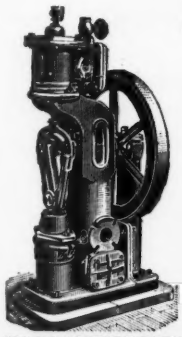

Fig. 705. "SINGLE RAM" STEAM-PUMP.

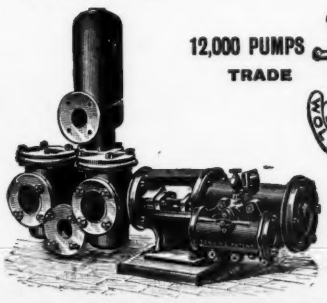

Fig. 598. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

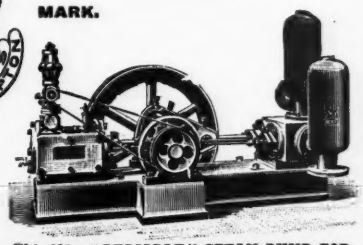

Fig. 685. "RELIABLE" STEAM PUMP FOR TAR AND THICK FLUIDS.

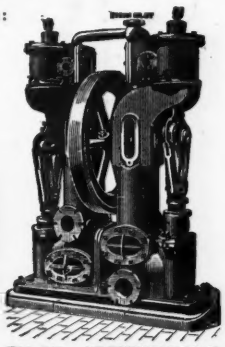

Fig. 712. "DOUBLE-RAM" STEAM-PUMP.

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